Motorship

Registered in U. S. Patent Office and abroad

Where round-the-world service, made practical by Diesel economy, has replaced two separate services with steamships

THE West Honaker, shown in the harbor at Bremen, Germany, is the first McIntosh & Seymour Diesel-Engine-powered motorship to complete a normal 26,450-mile round-the-world voyage in the new service of the Roosevelt Lines. Another similarly equipped sister motorship, the West Cusetta, had previously completed a 20,896-mile maiden trip, and with a third, the Crown City, is now on normal schedule.

These vessels are well able to maintain a profitable freight and passenger traffic, largely through the economy and dependability of their

McINTOSH & SEYMOUR DIESEL ENGINES

McINTOSH & SEYMOUR CORPORATION, AUBURN, N. Y.

AUG., 1927

PRICE 35c.

Motorship

Reg. U. S. Pat. Office and abroad.

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Volume XII August, 1927 *Number 8*

Motorships Are Essential To the Make-Up Of a Modern Mercantile Marine

Shipping Board's Dieselization Programme of 14 Conversions Marks the Most Constructive Step Yet Taken Towards the Establishment of an Active Merchant Navy—If Pushed to a Logical Conclusion

IT is a fashion, almost amounting to a fetish, to throw mud at the Shipping Board and at its efforts to place the American Mercantile Marine on a sound basis. The whole question of American shipping is an extraordinarily involved one and, while generally it is pitiably misunderstood abroad, it it, upon analysis, evident that it is very little better understood at home. Signs are not wanting that considerable thought is being directed in certain circles towards the future of the American Mercantile Marine. The general trend of thought seems to be "if no new ships are built immediately what is to become of the American Mercantile Marine when the existing tonnage is worn out?"

One of our contemporaries in a particularly succinct editorial article points out that Great Britain in particular is attaching no great importance to American sea competition in the future. In fact, many of her prominent men think that there will be no American Mercantile Marine. The *New York Herald-Tribune* in a recent editorial article entitled "Our Ageing Marine" voices fear that the American Mercantile Marine will slip back to its prewar status unless something is done very soon. This particular editorial article is written round the European visit of Representative Wood of Indiana, Chairman of the sub-committee in charge of shipping appropriations who, with other congressmen has just sailed to Europe for the study of American Merchant Marine conditions on the other side. These congressmen blithely stated before sailing that they could certainly advocate in the coming session two American built mammoths which would surpass recent productions of foreign yards, and which, in a word, would out-Leviathan the LEVIATHAN. This in itself is a fine and noble sentiment, but when we remember the apparently fruitless agitation that has been carried on to get even the AGAMEMNON and MOUNT VERNON reconditioned it does not seem to hold out much hope of fruition. There is too much misinformed verbosity and not sufficient intelligent virility among critics, and even among would-be helpers, of the Shipping Board. We have indicated above that there is a growing feeling of alarm that existing U. S. tonnage when obsolete—much of it is now obsolescent—will not be replaced. Let us ask ourselves what is at the present time the foreign-going American Mercantile Marine?

Diesel freighters of this type—not fast, but excellently equipped—carry American freight on ocean routes

A reasonable estimate would place it as 80 per cent Shipping Board services and 20 per cent private owners not all of whom operate their complete fleets under the American flag. Prominent American traders, shipowners and merchants have reiterated again and again the sentiment that American-built and manned and American flag steam ships cannot compete successfully with foreign ships on ocean trade lanes, unless ships of the most modern type, such as Diesel propelled vessels, are used, or unless existing legislation is modified. This idea, repellent though it may be to many of us, upon a close analysis and with a most elementary knowledge of economics appears fairly obvious. The coastwise mercantile marine is, of course a different story and represents a shipping section teeming with activity.

The answer is best seen in the fact that

only 20 per cent of American foreign flag tonnage is privately owned. From this point of view it is all the more surprising to find a man with the reputation, experience and mature knowledge of Capt. Robert Dollar demanding that the government get out of the shipping business. If the government got out of the shipping business where would we find the American flag on the high seas today? It is so easy for any private shipowner to make statements of this nature even though he be operating ships purchased from the Shipping Board at a figure presumably less than the cost would be for building in American yards. The private shipowner is always at an advantage because if he finds that operation under the American flag is uneconomical he can not only switch to foreign flag but can go abroad to build his ships. The Shipping Board can do none of these things. It virtually operates under coastwise conditions on all world trade lanes. It carries to the furthest corners of the world the American idea of comfort for officers and crew, and American standards for safety of life at sea and navigation, from which foreign nations can learn much, and yet if in doing this it operates at a loss it is bitterly criticised. Many foreign ships, too, operate under a foreign government subsidy which lowers their operating cost. The Shipping Board may be regarded in the light of a subsidy, but it is a badly hobbled subsidy.

It is a significant fact that the eleven largest, finest, and fastest motor freighters in the world are now operating under British flag out of New York in round-the-world service. These ships never return to their British ports of registry and in the main handle practically no British goods. They take out of New York and Atlantic Range ports American manufactures and bring back from the Far East raw materials for American industry. Enormous importance, therefore, attaches to the expected announcement that the Isthmian Line, as we stated in our July issue, proposes to build two big motor freighters for round-the-world service, which will be larger and more powerful than anything operating at the present time. This is a genuine attempt, a constructive attempt to do something with the American Mercantile Marine. There is every indication too that the vessels will be Diesel propelled, thus indicating that the owners are determined upon the latest and most up-to-date and most economical form of operation.

If American built ships are expensive to operate then the obvious thing to do is to fit them with propelling machinery which will reduce their operating costs by about one-fourth compared with steam. From this point of view the Shipping Board in converting its 14 freighters has done a remarkably constructive piece of work. These freighters are at present operating in a round-the-world service, as we indicated in our July issue. They have been criticised as semi-obsolete—as a case of new wine in old bottles. The criticism, possibly from a purely academic standpoint may have something in it, and yet it seems impossible to get appropriation for new tonnage from Congress. The conversion policy, for which MOTORSHIP has so long and consistently fought, would appear in this case to offer the best possible solution to the problem, but conversions, on the scale of those just carried out are lavish, and that is why the cost of the conversions has been high and has caused uninformed people to hold up their hands in horror.

The Shipping Board motorship fleet is not a converted fleet. It is a reconstructed fleet in which the only things remaining of the old steamer is the hull. It represents a technical absurdity because for very little extra cost new ships could have been built—with 15 knots speed. This idea was repellent to Congress and therefore the Shipping Board architects got to work and rebuilt, not converted, new ships out of old. In this work we see something monumental—a real attempt to place the American flag on the high seas.

It is to be hoped that the work will now be consummated by the placing of contracts similar engines and conversions. New ships are required, but until that point of view is seen by Congress we must be content with rebuilt ships. In the meanwhile, let us give full credit to the Shipping Board's technical staff for the excellent work they have done, and for the further work which, in all conscience, they must and will immediately pursue.

Motorshipping Construction Leads by 7,800 Tons

THE total amount of motorship tonnage now being built through the world is about 78,000 gross tons greater than all other types combined.

A jump of nearly 300,000 gross tons in the volume of motorships building was made during the last quarter, according to Lloyd's Register returns, bringing the total now building to nearly 1,460,000 gross tons for the world, as against 1,172,000 at the end of the March quarter, and only 885,000 tons at this time last year. Italy is especially active again in this class of construction, her present figures showing a gain of about 150,000 gross tons during the past quarter. There was an even sharper increase, however, for Great Britain and Ireland, during the same period, their gain amounting to nearly 170,000 gross tons. The contrast for the two quarters, between the countries going in extensively for motorvessels, is given in the following table of tonnage compiled for the last two quarters.

Motorships Under Construction

	1927 JUNE 30,	1927 MARCH 31,
Great Britain & Ireland	627,700	458,337
Germany	181,295	177,909
Italy	179,740	164,840
Other countries.....	470,860	371,092
World total	1,459,595	1,172,178

The gain for the smaller countries indicates that they, too, are turning largely to the type of vessels with Diesel engines.

Under the present status, 43 per cent of the world's building of motorships is being done by Great Britain and Ireland.

Returns made to Lloyd's Register showing the power of various types of marine engines being built or installed in all countries mark the chief advance to be in oil engines, the total indicated hp. at June 30th being 1,102,424, as compared with 918,536 at the end of the March quarter, for all the other maritime countries combined. At the end of the December quarter, however, new construction begun throughout the world was only 14,000 gross tons more than the launchings for the period. The gap now, however, is not as large as at the end of the March, 1927, quarter.

A continued gain in the construction of tankers of 1,000 tons gross and above is shown by Lloyd's returns, nearly 125,000 tons more now being under way than at the end of the March quarter. The figures for the United States more than doubled during the quarter ended June 30th.

Lloyd's figures, however, do not include steamers being converted to Diesel power, nor do they reveal that much of the tonnage being built abroad is actually for American ownership, although the ships will be operated under foreign flags.

Big Cosulich Motorliner for New York Run

COSULICH line of Trieste has definitely decided to place the motorliner VULCANIA, on the New York-Trieste run. The vessel is now receiving finishing touches by her builders and will sail from Trieste on her maiden voyage for New York on February 1, 1928.

Increased passenger traffic between the United States and Italy is given as the reason for placing the huge motor liner in the New York trade. The vessel, which has a gross tonnage of 26,000, is equipped with B. & W. double acting 4-cycle Diesels, which will give the ship an average speed of 22 knots.

MS. VULCANIA is equipped with the most modern conveniences, including a large Pompeiian swimming pool, gymnasium, Turkish, Russian and electric baths. There is also a children's playroom, a large ballroom, flower shop and a sports deck. The equipment for the beauty parlor and barber shop was manufactured in the United States.

Accommodations are provided for 900 first and second class passengers and 1,200 third class. Every cabin in first and second class is equipped either with a private bath or connects with a bath or shower. Even the lowest priced accommodation will be equipped with a private shower.

MS. VULCANIA has one sister ship MS. SATURNIA, which, sailing in October, will operate in the company's South American trade.

Cosulich Line plans to start work shortly on its two big motor Mauretanias, which as announced in our October 1926 issue will be equipped with Fiat-Diesel engines.

Diesel-electricity for New Conversions

Two Big Shelter Deckers of Courageous Class Slated for Hull Modification and Conversion—Specifications Now Being Prepared

DIESEL engine builders throughout the United States will welcome the Shipping Board's recent, though it must be confessed rather tardy, step for the Diesel-electrification of two of three existing steam freighters.

The success with which the existing Shipping Board Conversions are operating, as we point out in the first article in this issue, is a plain indication of the fact that other ships can be converted and can operate with equal success. If the American mercantile marine is to remain on the high seas, and if, as we have shown, the Shipping Board is keeping it there, then obviously we must have more conversions.... and quickly.

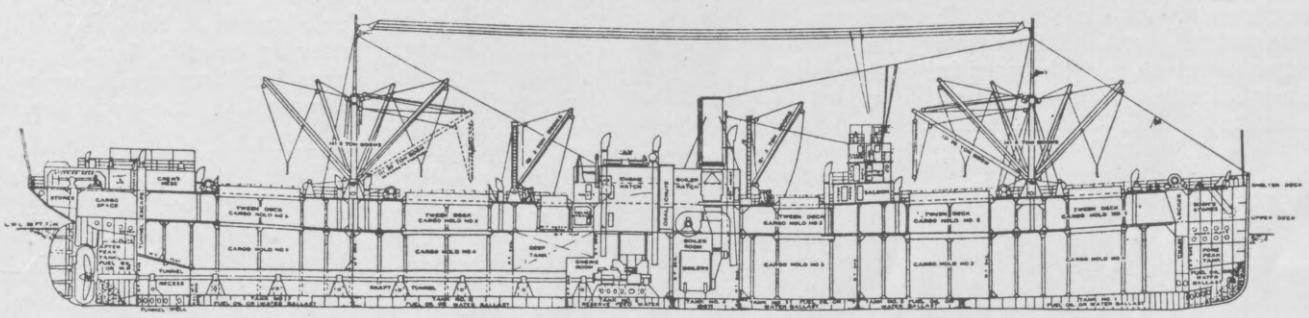
The ships which it is proposed to convert are exceptionally fine shelter deckers of nearly 12,000 tons dw., which should lend themselves to conversion with a minimum of cost. At present they have turbines of 3000 s.hp. which give them a sea speed of about 10.5 knots. The ships have an overall length of 457.5 ft., a beam molded of 56 ft. and a depth molded of 38 ft. The forward and aft ends of the ship will be removed and slightly lengthened and a new type stern substituted which is expected to give the ships an increased speed.

The Shipping Board has authorized Commissioner William S. Benson to employ Gibbs Brothers, Inc., of New York, and Real Admiral D. W. Taylor, U. S. N., Ret., jointly, to prepare plans and specifications under which bids will be sought for alteration and installation of Diesel electric equipment on one or two of three large steel cargo steamers now laid up.

Admiral Taylor and William Francis Gibbs, of Gibbs Brothers, have been working together on experiments relative to the possibilities of increasing the speed of ships by alteration of the hull line. They have submitted a report in which it is stated that their investigations indicate that certain changes in the design of the vessels considered will increase their speed.

The ships under consideration are the COURAGEOUS, DEFIANCE and TRIUMPH each of which is 11,773 tons deadweight.

Up to the present time the ships converted to Diesel propulsion have been for operation on direct Diesel drive. The plan for these two ships will call for Diesel electric drive with the main motors in the present engine room.



Inboard profile of the Courageous Class Shipping Board Freighters scheduled for conversion to Diesel-electricity in the immediate future

Status of the New Conversion Program

BIDS on an additional batch of single or double-acting direct-drive Diesel engines have been called by Capt. R. D. Gatewood of the Merchant Fleet Corp. of the U. S. Shipping Board for installation in the second group of steamships to be converted. Five manufacturers have been asked to bid on Diesel engines of 4,000 s.hp. at 105 to 115 r.p.m. Bids have been called in groups of two, three, four and six engines to enable from eight to twelve engines to be ordered, or more than twelve, if prices permit. The latter, of course, is due to the limited amount of money available in the fund. Bids on the direct-drive engines will be opened August 8th.

In addition it is hoped to invite bids on Diesel engines for installation in the hulls of one or two larger vessels which will have either straight Diesel or Diesel-electric drive pending on the character of bids received in accordance with the details given above. In these two vessels it is proposed to lengthen the hulls at the stem and stern. This work is under the supervision of Admiral D. W. Taylor, U. S. N. (Retd.), and Gibbs Bros., New York.

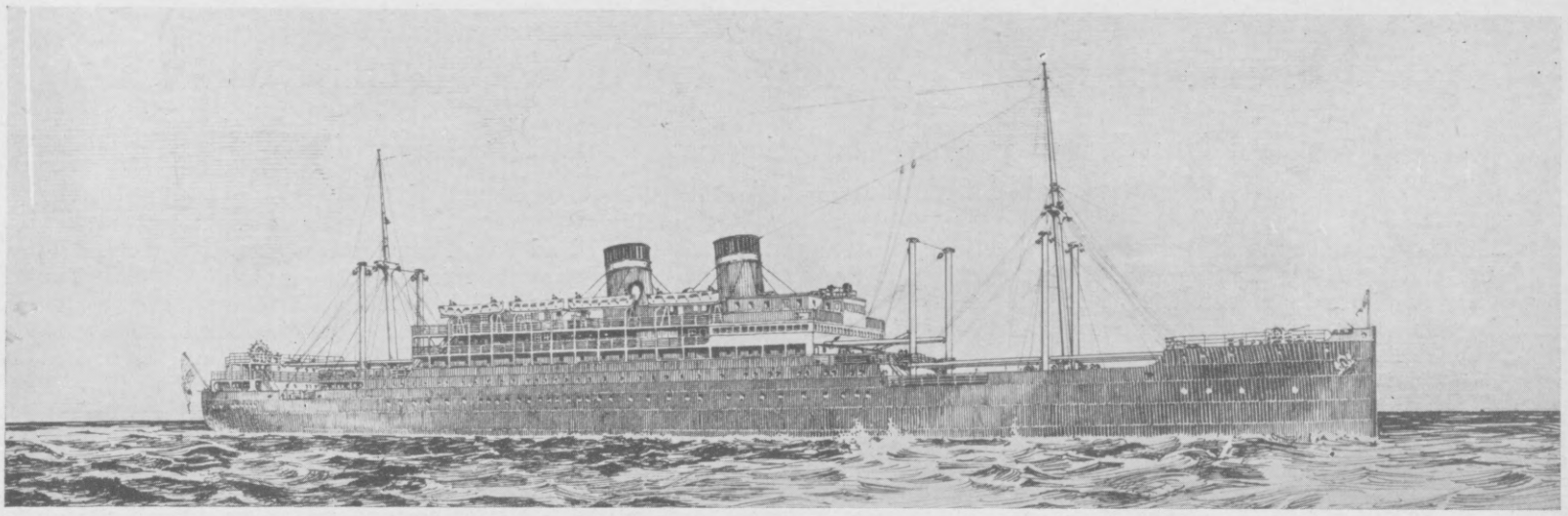
Dieselization, Aviation, Retrogression and Progress

WE have consistently preached the fact that motorshipping marks a new era in sea transportation. Recent events would seem to remind us that the change from coal to oil is even wider than this. The last few months have seen a phenomenal development in the science of aviation. So much so is this the case that many far-thinking people are beginning to measure the time which will elapse before transatlantic and even transpacific flight by air craft becomes an everyday occurrence.

There is no question that many of us alive today will see transaltantic passenger flight an accomplished fact before we die. Such phenomenal development may possibly appear at first alarming to those of us whose future is necessarily a future of sea transportation. We need, however, fear little direct competition from air craft for transportation in its widest sense, for very many years to come, and as far as the Diesel manufacturer is concerned, such thought of the future is even of less importance than to the shipping man because there is every indication that the prime mover for the big mail and passenger carrying air machine of the future must be of Diesel type.

The moral in all this development is this—nothing stands still. Development, which is after all a branch of evolution, is a continuous function of time. There are those who suggest that its rate with respect to time is not constant. In other words, that during certain periods, development takes place quicker than at others. The present era, it seems, is one of these periods.

A tremendous change is taking place at rapid rate in the method of generating power wherever it is required on this earth. Coal is passing with steam. Oil has arrived with the Diesel engine. Those who would be to the fore front in the race are those who early realize this change and equip their instruments of transportation with prime movers suitable to the present era. Retrogression, with which is allied lethargy and intolerance—and this latter is tempered with ignorance—can never assist progress, and yet the history of the world shows that so inevitable is evolution that retrogression must in time inevitably bow before it. . . . For this reason the progressive shipowner today, even if he is not fitting Diesels, is straining every nerve to find out the advantages which they will give him and is not contenting himself with old time thought.



Grace Lines Big Motorshipping Activity

Two New Motorliners to Be Ordered in Swedish Yard Immediately— Two 17-Knot Liners Due for Delivery Next Spring

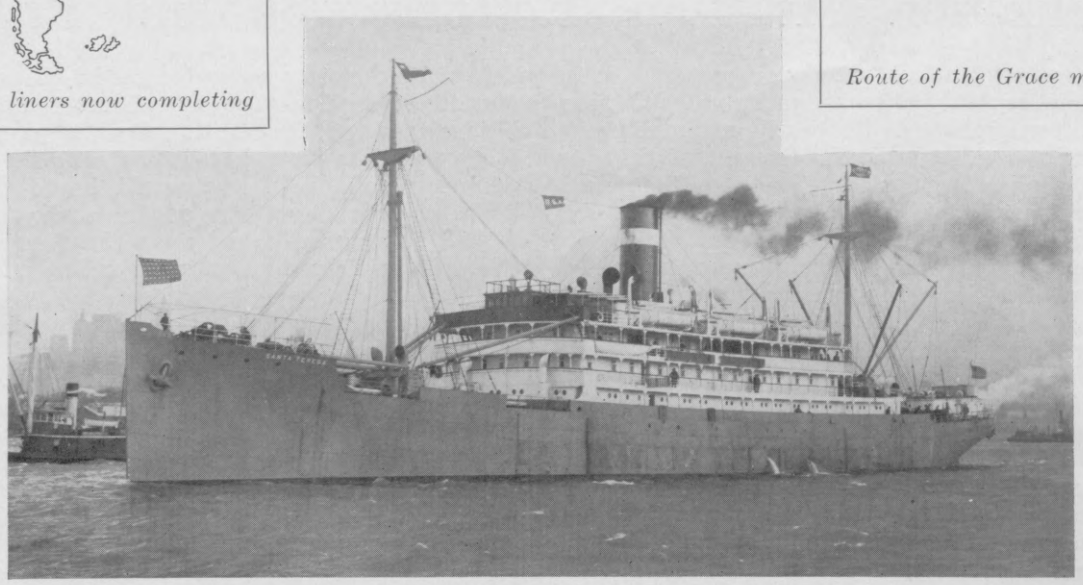
GRACE Lines of New York will shortly, it is announced, place a contract with the Götaverken plant, Gothenburg, Sweden, for two motor ships to be used in their New-York-Colombia, Ecuador, Peru, and Chile service. No details of the new ships are at present available, but it is expected that they will be superior to, and of course, far more economical than, existing steamers. The new ships will maintain passenger and freight service between New York and 19 South American west coast ports up to and including Antofagasta. Two motorships, ASHBEE and JACKSONVILLE, are already in this trade and when the two fast passenger ships constructing in Great Britain for the fortnightly fast South American service are commissioned early in 1928 the potential Grace motorship fleet will comprise six motorships. This includes the two Swedish built motorships, CITY OF SAN FRANCISCO and CITY OF PANAMA, whose successful working has, no doubt, considerably influenced the owners in the choice of their new tonnage.

The new fast ships, as the very "technically correct" artist's sketch reproduced above well shows, are fine looking vessels with twin stacks, the forward stack being a dummy. The whole hull appearance is bolder and more striking than that of existing Grace steamships, one of which we illustrate herewith. There is a tendency in the new ship to pyramid the structure amidships, There is a long forecastle and a long well deck in the center of which is the foremast. The derricks are stepped to derrick posts (vertical; the masts are raked) on either side of each mast. The new ships will have a displacement of about 14,000 tons when fully loaded. They will have accommodation for 160 passengers and for about 7000 tons of cargo all of which latter is handled by the most up-to-date cargo handling appliances which naturally includes electric winches. These are mounted at deck level in the forward well and not, as might have been expected, on houses round the mast base.

Their dimensions are 485 ft. length overall, 63.9 ft. beam and 36.6 ft. molded depth. For propulsion, they will have two Sulzer Diesels each of 4000 s.hp., driving twin screws—an aggregate 8000.

Route of the big Grace liners now completing

Route of the Grace motorliners just ordered



Ss. Santa Teresa, one of the existing crack steamers of the Grace Lines' S. American service

Shippers Now Demand Motorshipping

The New Era in Sea Transportation Gives Superior Service to the Shipper of Freight by Speed, Cleanliness, and Reliability

By H. S. Scott*

THAT the motorship finds its greatest value in the long voyage trades has become a platitude† in the shipping industry which is needless to reiterate. Just as the West is a land of tremendous distances, however, so is the Pacific an area of long voyages. Whether in the Oriental, the Australian, the South American or the European trades, the Pacific is therefore a logical field for motorship development.

This opinion is shared by us from our experience in the handling and management of both steamers and motorships in all of these Pacific trades during the past several years. Of course, there has been the problem of repairs due to absence of experienced engineers and mechanics, but that is to be expected in any new departure from the old way of doing things. As personnel ashore and afloat becomes better acquainted with this newer type of propulsion and as construction is becoming more standardized, this item of engine repairs and maintenance diminishes, and I believe before long it will not cause us any greater concern than in the case of a steamer. Then, too there has been the problem of getting electric winches that would assure cargo-handling as rapidly as in the case of the steam equipment, but this difficulty has also been largely overcome in recent years.

Greater economy in the fuel item enables motorship owners to operate vessels at greater speed, and we find that shippers are rapidly coming to expect a faster voyage from a motorship than from a steamer. It is becoming the popular notion. This matter of greater speed; greater cleanliness,—freedom from soot, dirt, dust,—freedom from heat of the boilers—all these features add to the effectiveness of the "sales talk" in the solicitation of cargoes.

The better crews that are attracted to the cleaner motor-vessel add to the general efficiency of operation. They also add to the greater comfort and satisfaction of passengers traveling aboard motorships. This is particularly true in the case of cargo vessels with limited passenger accommodations—a type common in these long voyage trades—where passengers are necessarily thrown into closer contact with the crew than on the regularly equipped passenger vessel.

For the South American trade, we are handling the vessels of the Westfal-Larsen Line—a fleet comprised of three steamers and two new motorships; the latter (motorships BRANDANGER, and HOYANGER) having having been completed in Copenhagen in 1926. On the outward voyage these vessels load chiefly lumber, canned fruits and vegetables and a smaller amount of manufactured goods.

The BRANDANGER has shattered all records in the trade by negotiating the voyage from Los Angeles to Buenos Aires via the Straits of Magellan in 29 days, reducing the time of the steamers from 4 to 6 days. These vessels all proceed from the Plate via Santos where large cargoes of coffee are loaded, returning to the Coast via the Panama Canal. Here again the BRANDANGER has established a record, having made this leg of the voyage in 26 days. Coffee, of course, is a high valued cargo and this increased speed is well regarded by the Pacific Coast coffee trade. The HOYANGER has only recently entered the service, and while her speed on this run has not as yet been demonstrated, we are confident that it will at least equal that of the BRANDANGER. The motorships bunker at San Pedro with enough fuel to carry them around the entire South American continent, while the steamers must bunker also in the Plate and at the Canal on the return trip.

In the Oriental trade, we have the Kerr Lines "SILVER" ships loading monthly in Los Angeles and San Francisco for the Dutch East Indies, Straits Settlements and Calcutta. These vessels are the SILVERLARCH, SILVERFIR, SILVERCEDAR, SILVERPINE, SILVERAY, and SILVERELM, capable of about 11 knots, all constructed in England within the past four years. They carry large quantities of case oil and other petroleum products, canned fruits and vegetables, automobiles and a limited amount of lumber. Motorship economy has made possible the exploitation of this new direct service, which eliminates the necessity of transhipment at Hongkong, or Singapore for numerous ports in the Dutch East Indies and for Calcutta.

It also affords the quickest time from the United States to the East Indies, the SILVERAY having recently completed the voyage from San Francisco to Macassar in 29 days. The homeward cargoes are comprised of gunnies from Calcutta, rubber, copra, spices, teas and miscellaneous run of products from the Dutch East Indies and Singapore. The motorship is especially suitable for rubber cargoes, which are so easily affected by dust and heat. On the outward trip these vessels bunker in San Pedro, and on their return from Calcutta, at Balikpapan in the Dutch East Indies. Arrangements are now under way, however, to take on sufficient bunkers at San Pedro for the entire voyage to Calcutta and return, due to the much lower price at which the fuel is available here.

In addition to this line, known as the Pacific/Java/Calcutta Service—we also represent the Kerr Steamship Company in their operation of new, rapid motorships in the Round-the-World Service. These have all been completed recently in Sunderland, England by Joseph L. Thompson and Sons, Ltd. They are the SILVERGUAVA, SILVERMAPLE, SILVERHAZEL, SILVERASH, SILVERBEECH, SILVERBELLE; deadweight capacity, approximately 9000 tons; fitted with 4 cylinder Doxford engines, developing 6000 hp.; normal speed, 14½ knots but capable of about 16 knots, without undue pressure. The SILVERBEECH and SILVERGUAVA now on the run have both developed a speed in excess of 15 knots, while news of eminently satisfactory trials of the SILVERBELLE, at a speed of 15.75 knots is now common property. They sail to San Francisco from New York, Savannah and Norfolk via the Panama Canal, and proceed from here to Yokohama, Kobe, Shanghai, Manila, Balikpapan, Macassar, Soerabaya, Samarang, Batavia, Penang, Colombo, and Port Said; whence they return to New York via Gibraltar. These freighters, undoubtedly the latest word in ship construction, are in my opinion the most modern of all cargo carriers entering Pacific Coast ports. Four of the vessels, have each been equipped with 60,000 cu. ft. of refrigerator space, supplying much-needed facilities for the transportation of California's fresh fruits and vegetables to Oriental markets.

Another line which has progressed rap-

Why Shippers Use Motorships

Greater economy in the fuel item, says Mr. Scott, enables motorship owners to operate vessels at greater speed, and shippers are rapidly coming to expect a faster voyage from a motorship than

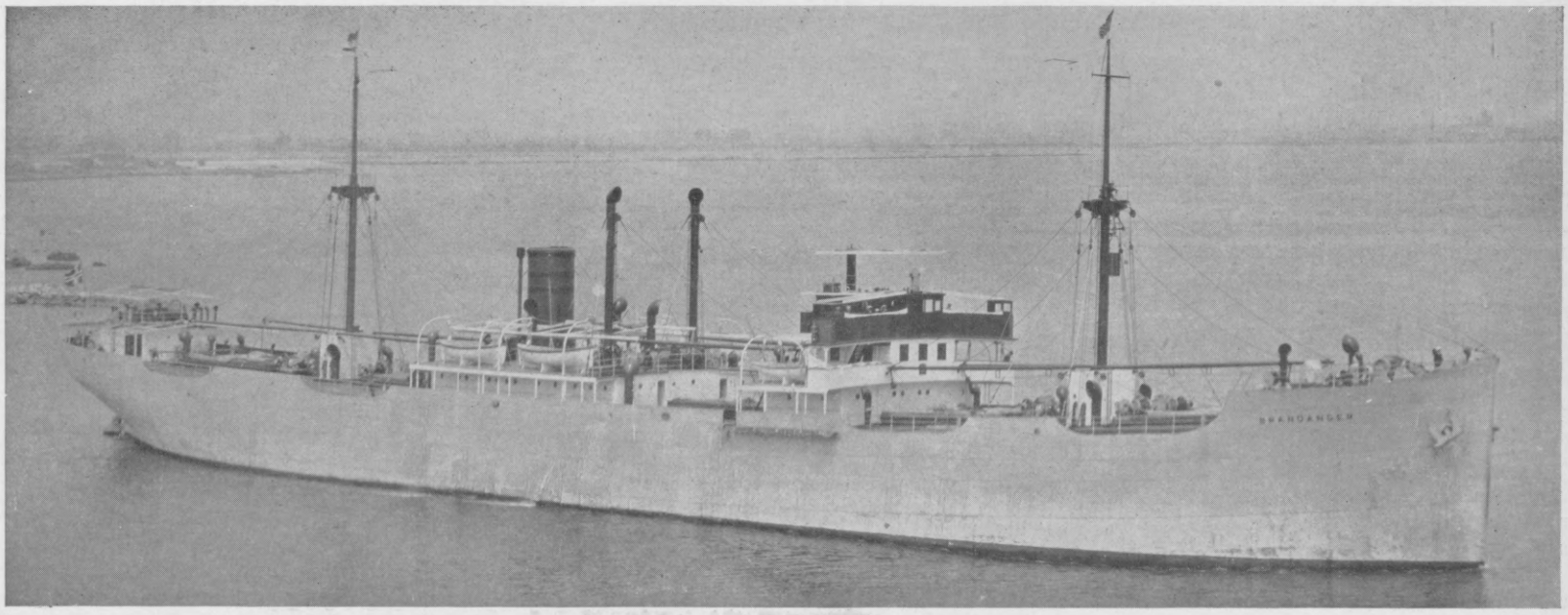
H. S. Scott,
General Steamship Corp.

from a steamer. . . . Greater speed, greater cleanliness—freedom from soot, dirt, dust—freedom from heat of the boilers—all these features add to the effectiveness of the "sales talk" in the solicitation of cargoes.

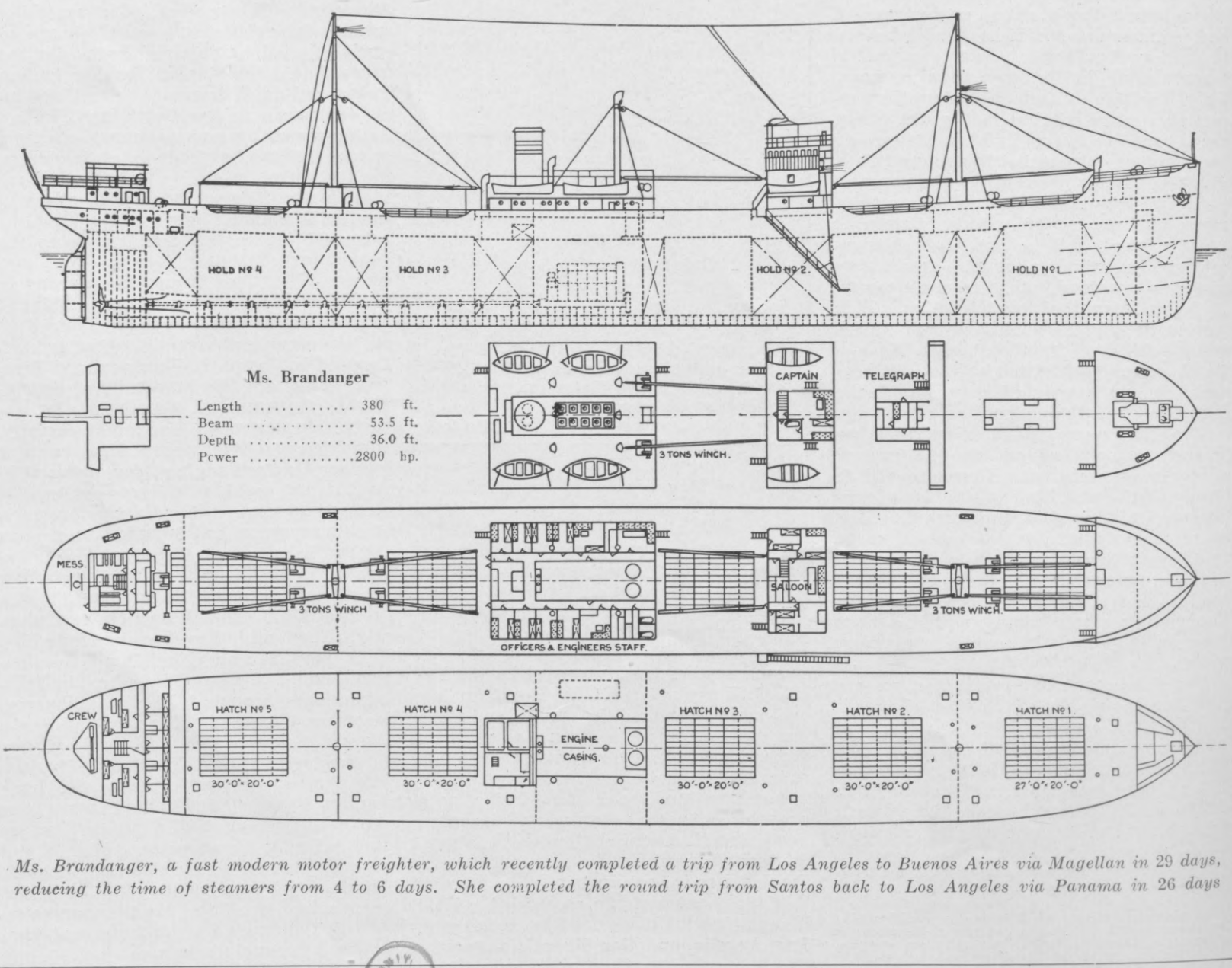
*President, General Steamship Corporation, San Francisco, Cal.

†A platitude, however, which is in danger of becoming an inaccuracy when viewed in the light of Diesel engine progress in coastwise, harbor, and short sea shipping. With the construction of Diesel gunboats too, even the warship is not immune.—Editor MOTORSHIP.

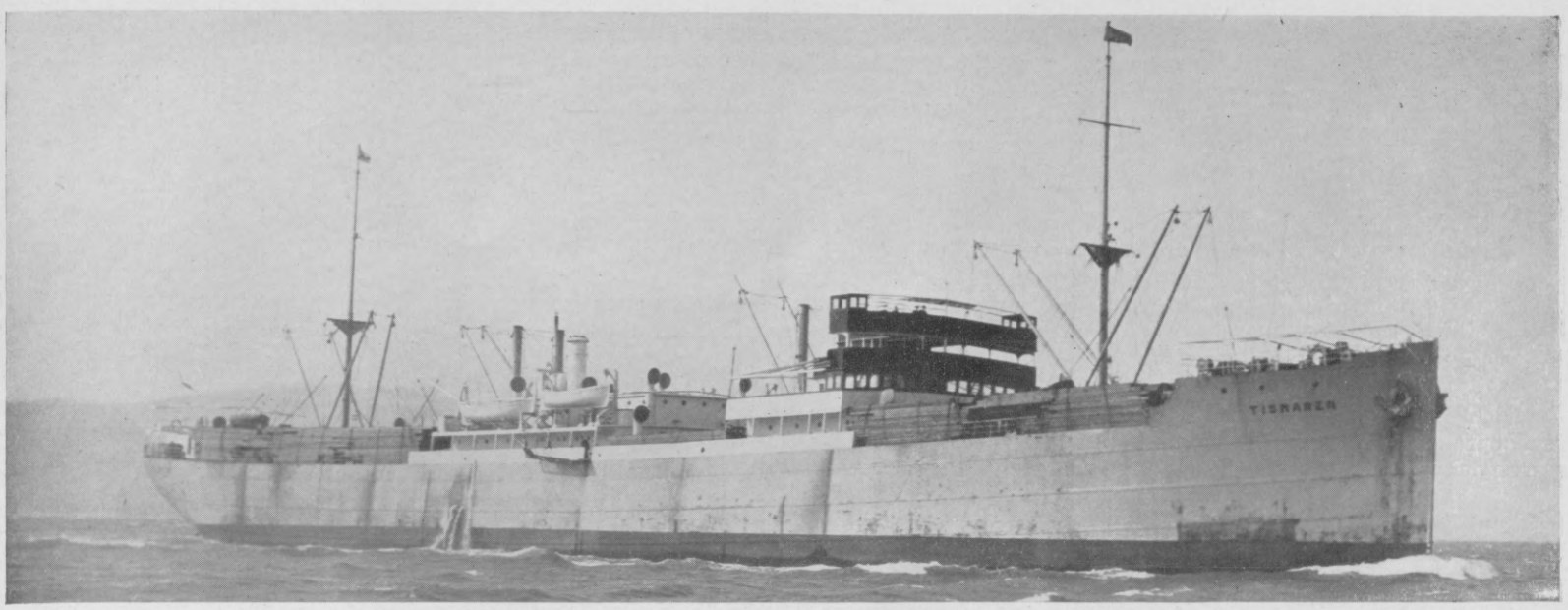
Clipping Steamer Time by 4 to 6 Days



Ms. Brandanger, 8350 Tons, Record Breaker in the Los Angeles-South America Coffee Trade



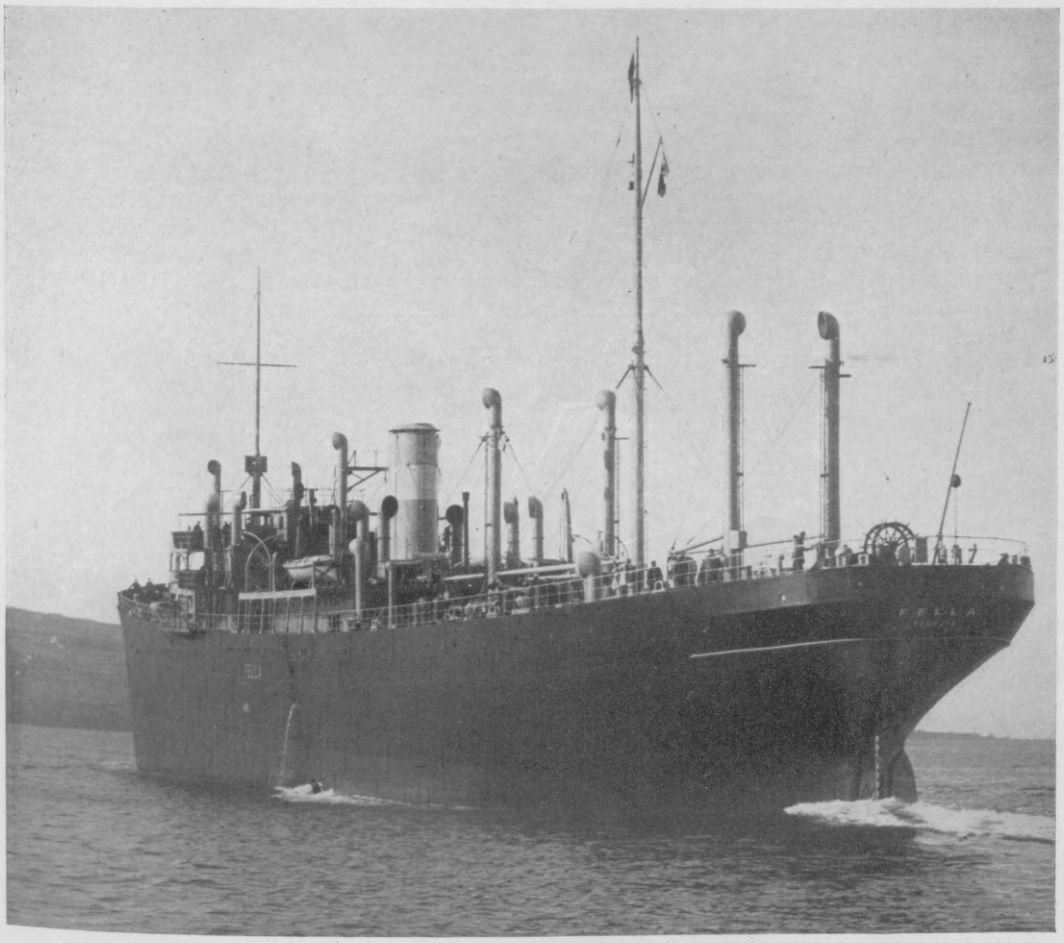
Ms. Brandanger, a fast modern motor freighter, which recently completed a trip from Los Angeles to Buenos Aires via Magellan in 29 days, reducing the time of steamers from 4 to 6 days. She completed the round trip from Santos back to Los Angeles via Panama in 26 days



Ms. Tisnaren, 9250 tons dwt., is a unit of the California Australia Direct Line—two days better than steamers' time to Brisbane

idly since its inception 2 years ago, is the Libera Line, owned by the Navigazione Libera Triestina, of Trieste, Italy, operated from the Mediterranean to the Pacific Coast, for which we are acting as General Pacific Coast Agents. The new motorships FELLA, RIALTO, LEME, CELLINA, and FELTRE, all constructed since 1925, have replaced the fleet of steamers with which this service was inaugurated. Each of these units is designed to carry about 10,000 tons of cargo with 300 tons under refrigeration and 35 to 40 passengers. These vessels ply between the Pacific Coast ports and the Canary Islands, Barcelona, Marseilles, Genoa, Leghorn, Naples, Venice and Trieste, affording the only direct service to the Mediterranean. As a result of the inauguration of this service a new trade has been developed and new markets have been opened for numerous kinds of goods. Plans are under way to increase sailings, commensurate with the development of the business. The outward movement is comprised largely of lumber, canned and perishable goods, and grain, while marble, cork, olive oil, provisions and general cargoes from the Mediterranean and also sugar, coffee and bananas from Central America are among the inward items. The vessels bunker generally at Los Angeles taking sufficient fuel for the round trip. They now reach Los Angeles from Genoa in 38 days.

We also represent two lines to Australia, operated for account of the Transatlantic Steamship Company, Limited, Gothenburg, Sweden, known as the North Pacific Australia Direct Line and California Australia Direct Line. Here both steamers and motorships are employed. Where the vessel is scheduled to return to the Pacific Coast, the advantages of the motorship over the steamer are less marked than in other trades, inasmuch as it is usually advantageous to bunker steamers with Australian coal on the return trip. Due to the absence of homeward cargoes, however, these vessels are most frequently routed homeward via ports where cargoes are available, e. g., via the Philippines for sugar or they may be sent to Europe in connection with the Australia/European Service operated by the same owners, and then routed back to meet their sailings from the Pacific Coast. When such operations are carried out, the motorship again is the more efficient.



Ms. Fella represents a new type of "passenger freighter" in Pacific Coast-Italy trade

The North Pacific Australia Direct Line is operated from Portland, Seattle, and Vancouver, direct to Brisbane, Sydney, Newcastle, Melbourne and Adelaide, the steamers reaching the first Australian port in about 30 days and the motorships in 28 days. These vessels load mostly lumber and manufactured goods, the bulk of the latter coming overland from the Middle West. The California Australia Direct Line, on the other hand, loads at San Francisco and Los Angeles, proceeding direct to the same Australian ports requiring about 27 days for the steamers and 25 days for the motorships to the first port of call. They carry redwood, white pine, petroleum products and a certain amount of manufactured items originating locally and in the Middle West. Motorships now in these services are the BRONNOY, HINNOY, NORDBO, TISNAREN, BULLAREN, and EKNAREN.

In connection with the general subject of motorships I am reminded of the question recently presented to one of the executives of an oil company by one of my friends, the Managing Director of one of the larger Japanese shipowning companies, on the occasion of his visit here. "When I return home," he said, "My people will ask about the outlook for the supply of Diesel oil, a vital factor in any proposed plan of motorship construction."

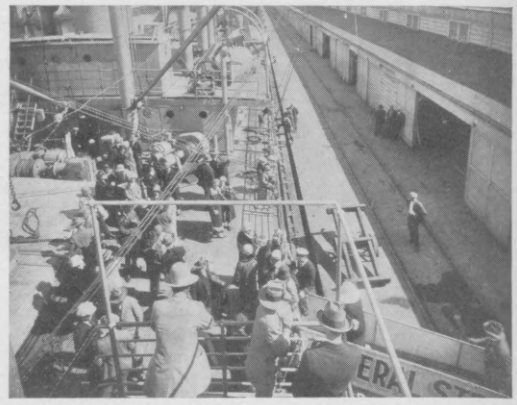
The oil man replied: "With extensive fields being developed in Venezuela far beyond our fondest dreams of a few years ago and with the prospects for new discoveries in the United States, in South

Kerr Liner loading automobiles

America and elsewhere, there is no cause for apprehension, in my opinion. Should scarcity require it, however, we have much to conserve in curtailing the use of oil for roads, in steam plants and in other methods of consumption that are more or less wasteful.

"Extension of the use of Diesel engines, moreover, is in itself, of course, a program of oil conservation. A barrel of crude oil gives more power when converted into Diesel oil and used in an internal combustion engine, than when burnt under boilers as fuel oil. And more power out of the same amount of crude will, as time goes on, help to conserve and extend our oil supply.

"Looking into the future, we in the oil industry feel that we shall always be able to protect the Diesel engine owner." This forms an important refutation of the fuel oil scare made periodically by scaremongers.



Passengers for Italy—Ms. Fella

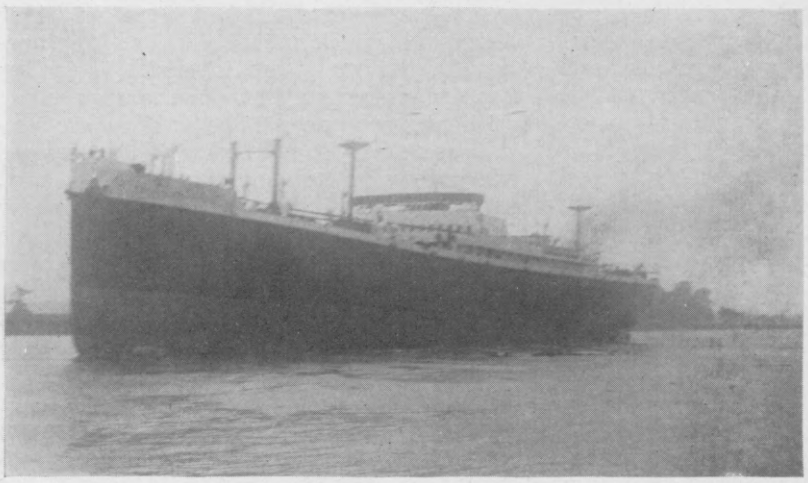
First of a Big Pacific Motorship Fleet

FIRST of a fleet of six new fast refrigerated motorships was launched by Blythswood Shipbuilding Company, Glasgow, Scotland, successfully on June 28, from their yard at Scotstoun. The large twin screw motor freighter PACIFIC RELIANCE has been built to the order of the Norfolk & North American Steam Shipping Company Limited, one of the associated Furness Withy concerns.

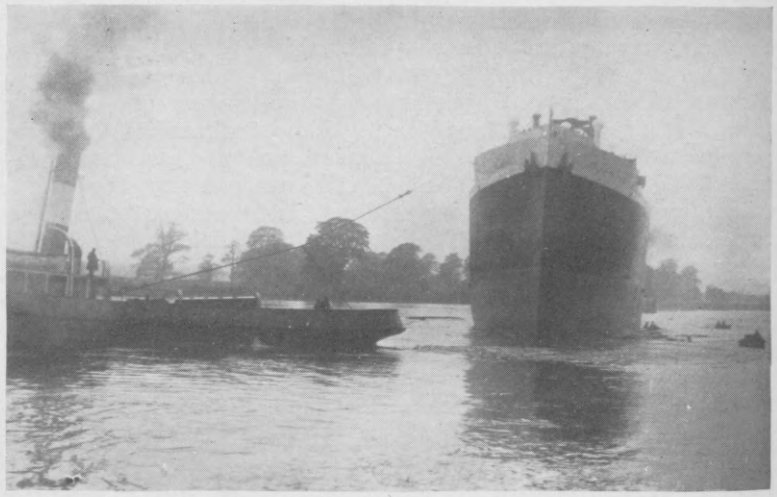
The vessel has been built under special survey to Lloyds highest class, and is intended for service between U.K.-Continent ports and the Pacific Coast, via the Panama Canal. The lower 'tween decks are insulated throughout for carrying fruit, and a complete installation of refrigerating machinery, fans, etc., is being installed. All the auxiliary machinery both on deck and in the engine room is electrically driven.

As we stated in MOTORSHIP last month one sailing every 10 days between the United Kingdom and Pacific Coast ports by the ships of the Furness line will be inaugurated on September 9 with departure of the new motorship PACIFIC RELIANCE from Manchester. Increased frequency of service will be made possible by the acquisition of six new motorships completing. These ships are named the PACIFIC RELIANCE, PACIFIC ENTERPRISE, PACIFIC PIONEER, PACIFIC EXPORTER, PACIFIC GROVE and PACIFIC PRESIDENT respectively.

Each vessel has 10,000 tons deadweight, a length of 450 feet, 60 ft. beam and twin screws propelled by B. & W. Diesels.

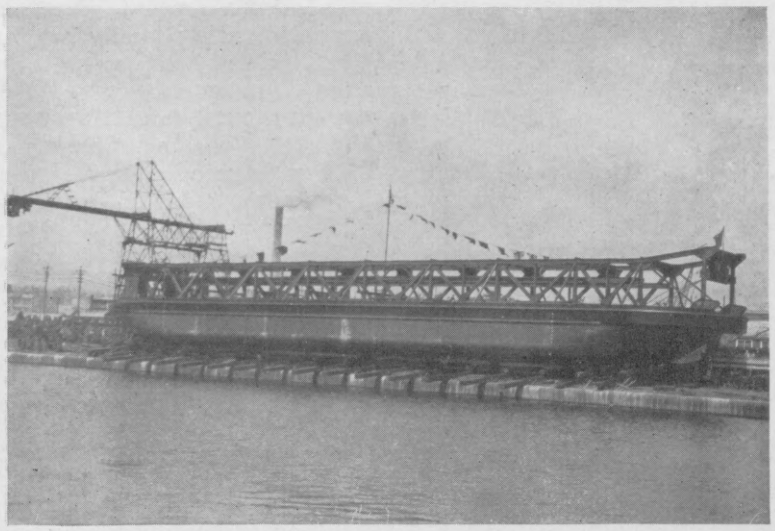


Ms. Pacific Reliance first of a fleet of six new motorships

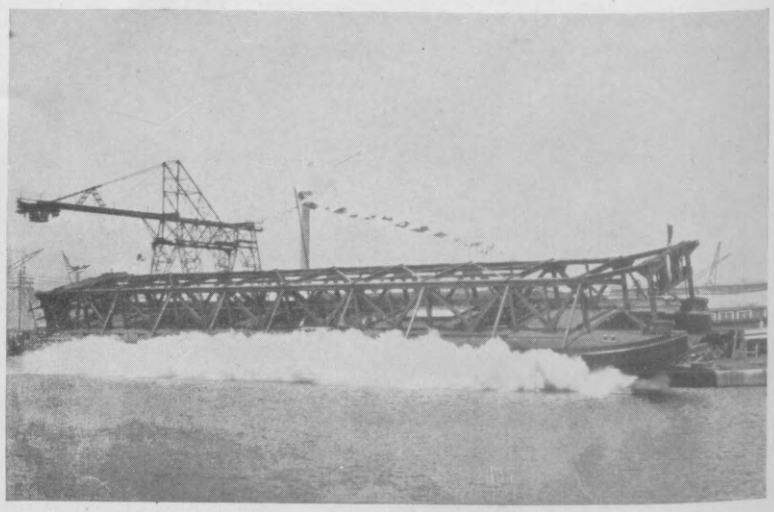


Ms. Pacific Reliance immediately after her launch

Launch of a Big Diesel Dredge on the Great Lakes



Diesel-electric dredge New Jersey on the ways at Manitowoc



Four Busch Sulzer Diesels power this Great Lakes Dredge & Dock Co. dredge

Hapag Liners' Novel Propulsive System

Four Compact 3000 Hp. Double-acting 2-cycle Diesels Drive Two Screws in Pairs Through Reduction Gearing

SIGNS are not wanting that the shipping world is evincing a more than ordinary interest in the gearing of Diesel engines. Germany—ever a pioneer in this direction—is to try out on or rather to apply gearing to, the new motorliners building for the Hamburg Amerika Line, which will each have four double-acting 2-cycle Diesels driving—in pairs—two screws through gears. The total plant will develop 12,200 b.hp. and will give a speed of 16½ knots. The geared Diesel ships of the Hamburg South America Line are said to be doing excellent service. America will shortly operate its first large ocean-going gared Diesel ship, the tanker TUXPANOIL which is being fitted with Falk Diesels and gears at the Baltimore plant of the Bethlehem Sb. Co.

The gearing of marine prime movers to the propeller or other driving agent is, of course, as old as the history of marine engineering. In the early steam plants spur gearing was used to gear up the speed of the slow running steam engine to that necessary to cause the screw to propel the hull through the water. As soon as the marine steam reciprocating engine had reached a stage at which it was possible for it to drive a propeller at speed—the same as its own—suitable for propulsion the need for gearing was eliminated. Later came the rotary prime mover—the turbine—fastest running of all prime movers. So fast was the normal speed of rotation of the turbine for best efficiency that it could only be employed to drive ships whose form demanded propellers which would operate for good efficiency at speeds approximating those of the turbine. Even so there was considerable slip.

Sir Chas. Parsons' classic experiments with the collier VESPASIAN were in effect the first serious attempt to apply the fast running turbine to the slow speed freighter —the reduction was effected through herring bone gears and upon their success was based the geared turbine as we know it today. Double as well as single reductions were attempted, although the former have not always been attended with such success as has characterized the latter.

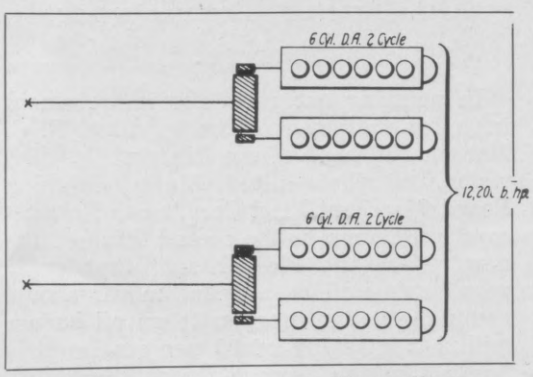
Those of us who regard motorshipping as the thing of the future like to imagine that the geared turbine, in spite of the wonderful economies recently effected, cannot pretend to outrival the Diesel in any real sense of the word. None of us, however, should forget the wonderful contributions made by the turbine pioneers to the science of ship propulsion.

Gearing, as applied to the Diesel, although tried out on some of the very early Russian river motorships occupies really a much later chapter in history. We must always recall that American enterprise had a great deal to do with early developments in this direction. One of the first geared oil engine drive installations to appear on the high seas in a sizable ship was installed in the cargo motorship JAMES TIMPSON, a wooden ship of 3600 dwt. capacity, built in 1918. She had a length of 266 ft., a breadth of 44 ft., and a depth of 35 ft. She was a twin-screw ship and powered with two 6-cylinder Winton Diesels, each developing 500 b.hp. at 300 r.p.m. The speed of the two propellers was 100 r.p.m. and the reduction gears were standard 26 in. center gear units, ring lubricated and built by the Falk Corporation of Milwaukee, Wis. The pinions had 40 teeth and the gears 119 teeth. Two D.P. Falk Co.'s 15 in. face, rolling mill type leather ring couplings were fitted between the engine, the crankshafts and pinions, as well as between the low speed gears and propeller shafts.

Characteristics of Hapag Motorliners

Length	540 ft.
Beam	72 ft.
Depth	36.5 ft.
Draft	28 ft.
Deadweight	10,000 tons
Total power	12,200 b.hp.
No. of engines	4
Speed of engines	230 r.p.m.
No. of screws	2
Speed of screws	110 r.p.m.
Speed of ship	16½ knots

Another sea-going motorship having her propellers operated through reduction gears and completed about this time was the twin-screw wooden cargo vessel LIBBY MAINE of 2600 dwt. capacity. She has 226 ft. overall length, a beam of 44.1 ft., and a depth of 20.6 ft., and is fitted with two



Machinery diagram, new Hapag liners

6-cylinder 320 b.hp. Dow Diesel engines, running at 250 r.p.m., the propeller speed being 100 r.p.m. Again the gear units were made by The Falk Corporation and are of standard rolling mill type with ring lubrication. The pinions have 31 teeth, the gears 77 teeth, 2 D.P., and the face width is 16 in. This gear unit was built under Lloyd's inspection.

Both these ships were wooden structures built during the rush of the war. JAMES TIMPSON was abandoned in December, 1924. in a hurricane, after having completed 190,000 miles at sea. LIBBY MAINE is at the time of writing in satisfactory operation.

Geared oil engine drive was adopted for the German motorships HAVELLAND, commissioned in November, 1921, MUENSTERLAND, commissioned in January, 1922, and VOGTLAND, commissioned October, 1924. All these three twin-screw ships have a total dwt. capacity of 10,235 tons and a propeller power of 3300 s.hp.

The engines are standard M. A. N. full Diesel air injection type submarine type Diesels. The piston diameter is 20.87 in. with 20.87 in. stroke. Each engine has ten working cylinders, designed for a maximum of 3000 b.hp. at 390 r.p.m. when operating in the war ships, but cut down to a steady load of 1660 b.hp. at 230 r.p.m. in merchant ships. The pitch diameter of the pinion is 31.5 in., of the gear 85 in., number of teeth 167 and 452 respectively, 47.2 in. face, 5.31 D.P.

The drives were built by Blohm & Voss, Hamburg, and follow the lines laid down in the JAMES TIMPSON and LIBBY MAINE, from which they differ only by the method of coupling engine and gear unit. The engine crank shaft is connected to the pinion in quite an original manner. The pinion is bored hollow and a tube-like extension or quillshaft attached to its free end. A torsion shaft about 23 ft. long and rigidly connected to the crank shaft runs through pinion and quill shaft being attached to the latter's end. Thus a flexible connection is interposed between engine and gear unit. The crank shaft is fitted with a very heavy fly wheel and a second fly wheel is fitted to the end of the pinion shaft.

In November, 1924, the Blohm & Voss Co. completed another geared ship, twin-screw ms. MONTE SARMIENTO, which was followed several months later by a sister ship ms. MONTE OLIVIA. In the propelling machinery of the two ships the same principle of gearing a number of engine units is used as was first realized by The Falk Corporation. The two ships are combined passenger and freight carriers of 13,628 gross tons apiece with a length of 523.9 ft. Each of their twin propellers is driven by a pair of 6-cylinder Diesels of a combined output of 3500 b.hp., the total power of each ship being 7000 b.hp.

Very heavy fly wheels have been fitted on the engines and brakes provided on them in order to permit quick stopping when maneuvering.

A short time later a fourth HAVELLAND type ship named VRIESLAND was built by the same yard, but in this ship the twin screw arrangement was abandoned and replaced by single screw propulsion. In this case the propelling machinery consists of a pair of 10-cylinder engines of exactly the same type as in the older ships, but these engines are geared to one propeller in exactly the same way as in the case of the MONTE SARMIENTO engines. The propelling power transmitted through the low

speed gear is 4000 b.hp. This ship was commissioned during 1926. Another expression of the idea is represented by the introduction of the hydraulic clutch invented by Dr. Foettinger. The first installation of this kind was made in the ms. VULCAN, commissioned in July, 1924. This was a 2000-dwt. ship having a length of 229.7 ft., a beam of 36 ft., and a load draft of 16.25 ft., and two 6-cylinder engines of 310 b.hp. each at 300 r.p.m., operating the propeller through the reduction gear at a speed of 85 r.p.m.

MS. DUISBURG of 9500 dwt. capacity, commissioned in July, 1925, and her sister ship RENSBURG, are both equipped with a Foettinger geared drive. The propelling machinery consists of a pair of 8-cylinder M. A. N. type engines. The total power developed is 4100 b.hp., with an engine speed of 210 r.p.m., and a propeller speed of 79 r.p.m.

The new transatlantic ships for the Hamburg Amerika Co. are novel in character they will have four Diesels of 12,200 collective b.hp., which will propel them at a speed of 16½ knots. The engines are double acting, 2-cycle units, operating at 230 r.p.m. connected in pairs through gearing to the two propellers which operate at 110 r.p.m. normal speed. The engines are of M.A.N. type, but will be constructed by the yards building the ships, one by Blohm and Voss, Hamburg, the other by the Bremer Vulkan, Vegesack. Each engine has six cylinders of 19.5 in. diameter and 23.5 in. piston stroke. It is claimed that, with this arrangement, any danger of vibration of the ship's hull will be excluded, especially as there are four engines, and the impulse from each piston stroke is only small. The height of the engines is small so that decks can be extended over the engine room. The weight per horse power of the fast-running double-acting 2-cycle engines is said to be decidedly less than that of any other type.

The ships, which will be very similar to the steam driven CLEVELAND class of the Hapag, will be named ST. LOUIS and MILWAUKEE, respectively. The main dimensions of the vessels will be 540 ft. by 72 ft. by 36½ ft. and on a draught of 28 ft. they will carry 10,000 tons deadweight. Dimensions and deadweight capacity are actually somewhat smaller than those of the original CLEVELAND class, but, being motorships, the new ships have a decidedly larger useful capacity. The engine power and the speed of the new vessels is larger than that of the CLEVELAND class.

Problems of Mechanical Injection

AT a recent meeting of the Diesel Engine Users Association, London, Oswald Wans discussing developments in mechanical injection oil engines said that during the last few years marked improvements had been effected in both 2- and 4-cycle engines of British design and manufacture. The call for vertical engines had resulted in the building of larger units, and today 4-cycle land engines ranging up to 1000 b.hp. and 2-cycle marine engines up to 5,500 b.hp. were available, and these did not represent the possible power limit.

Some 5 years ago when he read a paper before the Diesel Engine Users Association on recent developments in mechanical injection oil engines he had hazarded the opinion that the system would be more widely used. Not only had this proved true, but there were indications of its still more extended application. This seemed inevitable in view of the simplicity, proved reliability and efficiency of the system.

In reviewing the progress made in the airless injection 2-cycle engine, he said that the outstanding feature was the adoption of higher compression pressures; in fact, this departure was mainly responsible for the advance that had been made. Formerly pressures of 150 to 180 lb. per sq. in. were general practice, and necessitated the use of an unjacketed hot bulb, but with the advent of higher pressures this unsatisfactory feature had been discarded. Probably the first engine to break away from general practice was that built by Plenty & Son, Ltd., in 1920, in which a compression pressure of 220 lb. per sq. in. was employed.

In the new Vickers-Petters engine the compression pressure had been carried higher, being about 320 lb. per sq. in. The cylinder head was completely waterjacketed, the jacket over the combustion chamber proper being in the form of a large separate detachable cover which could be completely removed in order to clear out sediment from the water space. A small pocket was provided suitable for a starting plug, either of the electric or lamp-heated type. Many improvements had been effected in the general design, and a marked reduction had been effected in the consumption of lubricating oil which was generally high in 2-cycle engines of the crank-case scavenge type.

The progress made with 4-cycle engines of the mechanical injection type had been marked. Prior to 1921, mechanical injection had been almost entirely confined to horizontal engines, but the requirements of Central Power Stations had since rendered this type unsuitable, the demand being for higher rotational speeds and reduced floor space. On the other hand for certain classes of work the greater accessibility and slower speeds still offered advantages and were considered sufficient to justify engines of this class.

The author gave some information concerning special features of the vertical engines which were made by Ruston & Hornsby, Ltd. A development was the apparatus which had been devised for checking the load on each line of a multi-cylinder engine. By watching the fall of a series of floats the rate of fuel supplied to each cylinder was at once seen, and by means of the apparatus the distribution of the load could be checked in a few minutes, leaving no excuse for the man on watch not carrying out the procedure as a daily duty.

The realization of high thermal efficiencies must be largely dependent upon the heat resisting properties of the materials at the disposal of the designer and although considerable strides had been made in this direction there was still much scope for investigation. The closer work between the metallurgist and the engineer had in recent years produced better materials and designs with marked improvement in the life of castings subjected to high stresses and temperatures. Nevertheless further progress was at the present time restricted by this factor.

Oil, Coal or Electricity for Cooking?

In pointing out room for improvement in galley equipment on cargo ships, E. C. Mausshardt, head of the Reserve Fleet Division, of the United States Shipping Board, Merchant Fleet Corp.'s San Francisco office, claims in the second issue of the new "Merchant Fleet News" that every vessel using oil as a prime mover should equip the galley range with an oil burner and that a saving of 50 per cent is thus possible in the average freighter's galley.

We do not agree in toto with this conclusion where motorvessels are concerned. Electric ranges, bake ovens, and other electrical cooking and heating appliances have been shown to be more economical, cleaner and safer than oil burning ranges. Whether a vessel is a tug, ferry, yacht, tanker, freighter, or passenger vessel, provided she is driven by Diesel engines, the cost of current including fuel and lubricating oil never exceeds ½ cent per kw. hour and can be reduced to slightly below that figure if storage batteries are used and charged with surplus current from the generators, which is frequent available.

New Nelseco Powered Tug

LONE STAR, a 200-ton seagoing Diesel tug, which was launched recently at the Marvel Shipyard, Newburgh, N. Y., for the International Cement Corporation, has proceeded south for towing between St. Stephens, Ala., and New Orleans. The tug is 90 ft. over all, 82 ft. on the water line and is of 21 ft. beam with a maximum draft of 8 ft. The vessel is powered by a Nelseco Diesel. Sleeping quarters are provided for fourteen persons.

LONE STAR will tow two 1,200-ton and one 600-ton barge on each trip of its run, a distance of 250 miles.

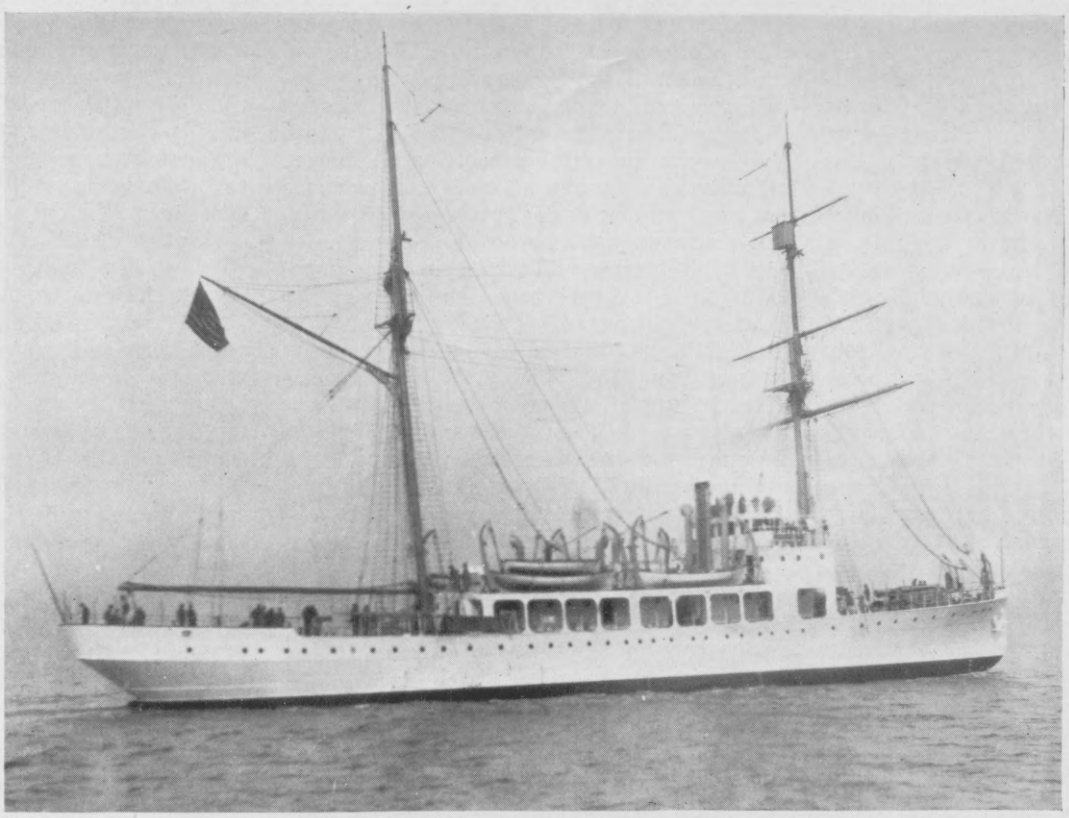
City Of Dalhart Has Sea Trials

Trials of the concerted Shipping Board freighter CITY OF DALHART were run at Newport News on July 26th. This vessel, which has been converted at a cost of $829,750, is equipped with a Busch-Sulzer single-acting, 2-cycle air injection Diesel engine of 3,000 b.hp. The displacement of the CITY OF DALHART is 13,010 tons. The cost of the Diesel engine and spare parts was $247,330.

Motorshipping Marks New Era in Sea Transportation Business*

New Outlet for Activities of Diesel Engine Builders Is Seen in Cruising Sloops and Gunboats Built as a Result of Naval Armament Limitations

THE placing of a contract by the Argentine Government with a British shipyard for two Werkspoor Diesel propelled naval sloops appears to provide yet another outlet for the activities of Diesel engine manufacturers, and more especially so when one recalls that H.M.S. ADVENTURE, the first warship to use Diesel engines for cruising purposes has recently been commissioned. There is under construction also at Barrow-in-Furness a submarine mother ship in which main propulsive power is supplied by double-acting 2-cycle M.A.N. Diesels. Certain monitors constructed during the war were powered by Diesel engines, some suitable and some unsuitable, while a Dutch Diesel-electric submarine depot ship has been in service for some few years. Submarines themselves are, of course, in every sense of the word motorships. . . Some of us who are interested in Diesel engine progress like to think that these ships, collectively, are at the thin end of the wedge winch, when driven completely home, will result in the motor battleship or the battle motorship, whichever you will.



The modern cruising sloop is aesthetic in masts and yards but efficient in Diesel propulsion

The thought is an interesting one to toy with but when we reflect upon the comparatively negligible number of large ships and perhaps even the restricted number of cruisers likely to be built within the next few years, in the normal course of events, the prospect from the Diesel engine developer's point of view is not a very live one. A Diesel driven battleship or high speed cruiser at the present juncture does not seem a possibility, but the cruising ship, and particularly the small cruising ship, is another story. The true cruiser is only a cruiser when she is cruising—if we are to interpret terms exactly and literally. She is cruising, in normal peace times, roughly 75 per cent of her active life. She is an expensive ship to operate in any case so that if during the time she is cruising her main shafts can be turned by prime movers using about one-quarter the amount of fuel per equivalent power that the steam plant would use, there is much more incentive to keep her at sea for longer periods and hence to increase the efficiency of her crew. Then again, remember that the modern cruiser, like the modern merchant ship, is an electric ship and consider the further economies possible if the cruising Diesels could at the same time generate electricity for the ship's needs. Pure Diesel-electric drive would probably absorb too much space and weight, but if Diesels are used why not put motor on the center shaft in a 3-shaft arrangement? Assuming, of course, that it could be arranged conveniently on the same shaft, or even geared to the same shaft as the turbine. . . . There are many possibilities.

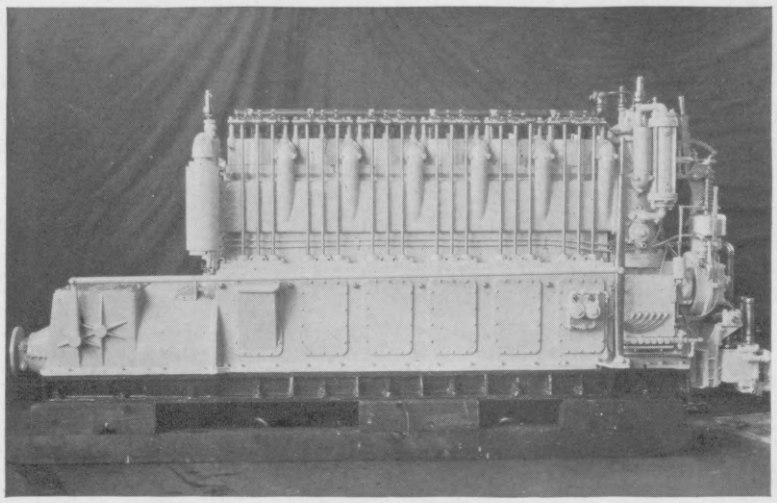
A New Outlet

Big naval construction does not seem to be likely to go ahead on a large scale within the near future—particularly if the present naval disarmament schemes mature. Any limitation on big ship construction must inevitably throw back to small ships and the demand will be for small cruising sloops for "showing the flag" all over the world. . . . That's where the Diesel comes in. America has the first Diesel "sloop"—the Coast Guard Cutter NORTHLAND. *Her 33 big Coast Guard Patrol boats with Winton Diesels are sloops. In this article—No. 4 of our series—the author discusses the motor sloop and its possibilities.*

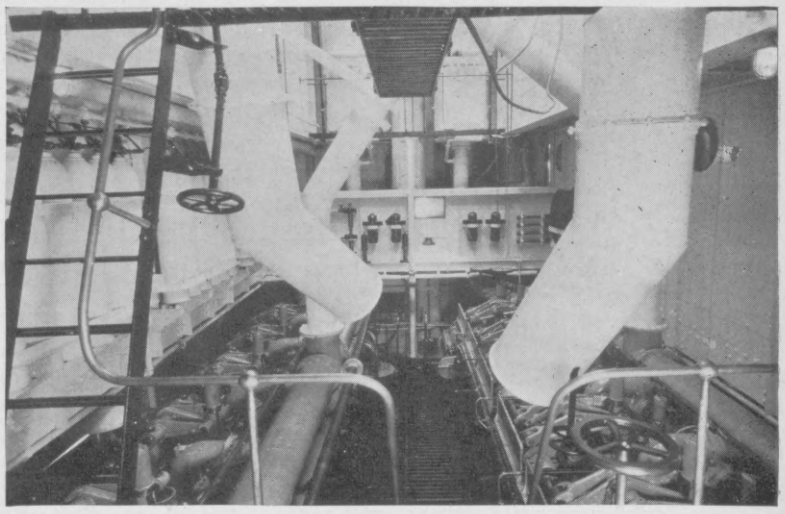
It is rather with the smaller cruising ship of so-called "sloop" variety that we are directly concerned here. This is the type of ship which helps to maintain law and order in the far flung corners of the world, which patrols the Persian Gulf, which lands marines in China in conjunction with the River gunboats. The sloop type of ship patrols the Grand Banks maintaining, under the American flag, the International Ice Patrol. It penetrates far north into the Arctic circle in the U. S. Coast Guard Service. Under the guise of the impressive title of Fishery Protection Cruiser the sloop type of ship may be found in the vicinity of large fishing fleets in most parts of the world. The fleets of the Dogger Band learn to keep to regulations under the sharp eye of vigilant craft flying the White Ensign. Danish patrols take care of the Iceland fisheries, and anywhere on the long American coastlines you may find the smart Diesel driven Coast Guard patrol vessels, a fleet of 33 of which has recently been completed. . . . Their duties, of course, are other than those comprising mere fishery protection work.

With a displacement of some 220 tons, a length overall of 125 ft. and a total power of 300 hp. these seaworthy little ships are probably at the lowest end of the scale of the sloop class and at the highest end of the launch or submarine chaser type. It is convenient to include them in the sloop class, however, because, in the first place, they represent a new thought and are definitely larger than any existing submarine

* No. 4 of a series of specially prepared articles written for those who desire a concise summary of the motorship in relation to sea transportation.



Air injection 4-cycle Winton Diesels of 150 hp. for Coast Guard Sloops



Single-acting 4-cycle McIntosh & Seymour Diesels for Cutter

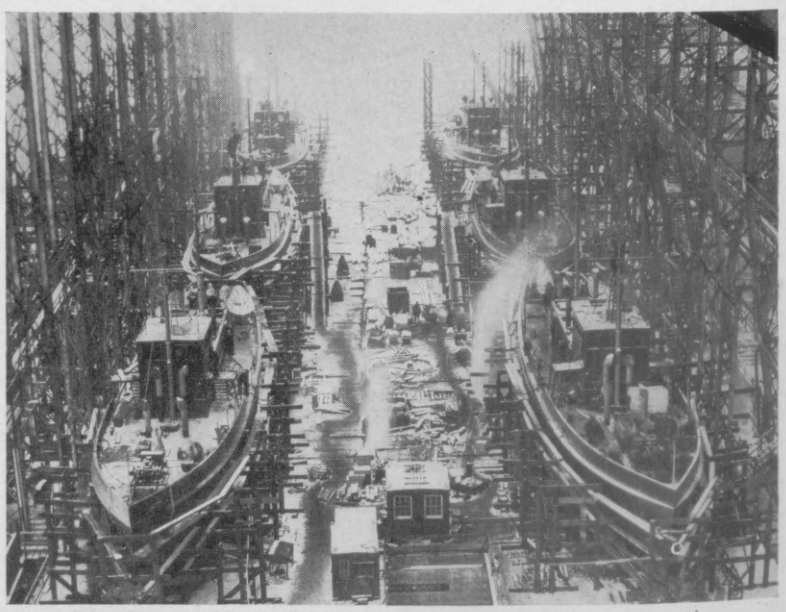
chaser type, while in the second place their strong seaworthy hulls and comfortable arrangement makes it possible for them to remain at sea for several days. The actual time that they do so, however, naturally depends upon the speed, or bursts of speed, at which they are compelled to operate, and upon the fuel capacity. It is just in this direction that the Diesel engine with its very low fuel capacity shows up to such advantage, because the role of these or any other cruising ships essentially comprises periods of duty in which all speeds from cruising speed, downward to minimum and upward to maximum, may be called upon. Following such duty come periods spent at anchor or in port where all the requirements of the ship can be taken care of by one or more auxiliary generators.

With the exception of the two new ships referred to above now constructing for the Argentine government, the cutters constructed for the International Ice Patrol, a ship completed recently for the Arctic service of the U. S. Coast Guard, a steam ship built for the Egyptian government by Hawthorn Leslie & Co. and the U. S. Coast Guard cutters the world's sloop fleets are composed of a very few surviving prewar units and a number of post-war ships. The British navy was particularly fortunate in this respect in possessing, at the time of the armistice, a number of specially designed ships intended for minesweeping and patrol service in the roughest of weather all over the war area. These ships comprised the handsome "Flower" class of about 1200 tons displacement and the smaller "Hunt" class of about 840 tons displacement, i.e., about the same size as the new Argentine ships. Units of these classes are now doing wonderful service all over the world but they are wartime designed and built craft and for this reason it seems not unreasonable to assume that replacements will soon be made. Especially is this likely to be the case if the present tendency of the Great Powers to limit size and output of agressive units of naval warfare persists. The results of such limitations must inevitably direct attention to the construction of ships for the more passive "police duty" ships. Diesel engine builders both in America and abroad will do well to give attention to this question, as an outlet for their future activities.

Let us now see something of the advantages and of the limitations of the Diesel engine for this class of work. In the first place, there is the ever present question of weight per horsepower. The Diesel engine is still on the heavy side and it is largely this disadvantage which is making its entry into the faster coastwise and cross channel ship field slower, compared with its conquest of ocean trade lanes. In other words, light shallow draft ships of high speed (i.e. 16-18 knots) need light machinery. However, in ships of the sloop class it absorbs considerably less space than a corresponding steam plant, consumes one-third to one-quarter the fuel, is more comfortable for engine room crews to work by in tropical waters, and is instantly available for use. This latter is by no means an unimportant point, particularly in ships which are designed for service in or around zones subject to earthquakes and tidal waves. The ship which is snugly at anchor in a tropical harbor in the Southern Pacific or on the iron bound rainless Pacific South American coast may find herself at a grave disadvantage if she has to raise steam on a battery of boilers before she can cut and run for the open sea. The motor sloop, on the other hand, is ready for full speed within two minutes of the receipt of a storm warning. A motor sloop operating in the Red Sea does not subject her engineroom crew to the awful heat of a steam engine room and renders the employment of a native engine room crew unnecessary. A complete refrigerating plant can be installed and operated very cheaply by electricity, current being taken from one or more small Diesel generators or even from the main prime motive force itself, if the ship is electrically driven.

The Coast Guard authorities in America are particularly interested in electric drive for their vessels of sloop class, most of which are of around 1200 hp. Captain

Launch of a 220 ton steel Diesel Sloop for Coast Guard



Big fleet of U. S. Coast Guard Sloops under construction

Newman, Engineer-in-Chief, U. S. Coast Guard Service, expressed recently to the author his appreciation of this type of drive in no uncertain terms. His confidence in Diesel-electricity can be measured by the fact that he deliberately selected this form of propulsion for the sloop NORTHLAND recently built at Newport News, Va., and commissioned for service in Alaskan waters. This little ship, 216 ft. 6 in. in length overall and displacing 2050 tons on a 15 ft. draft has a speed of about 11 knots which is given by a 1000 hp. General Electric double armature motor receiving its current from two 410 kw. generators, each driven by a 6-cylinder 600 hp. McIntosh & Seymour Diesel. This ship is very sturdily built, her hull is heavy and designed to resist ice pressure and severe storms. This will be realized when we see the above comparison between the U. S. S. NORTHLAND and H. M. S. NEWARK, one of the "Hunt" class minesweeping sloops.

Comparison Between Northland and Newark

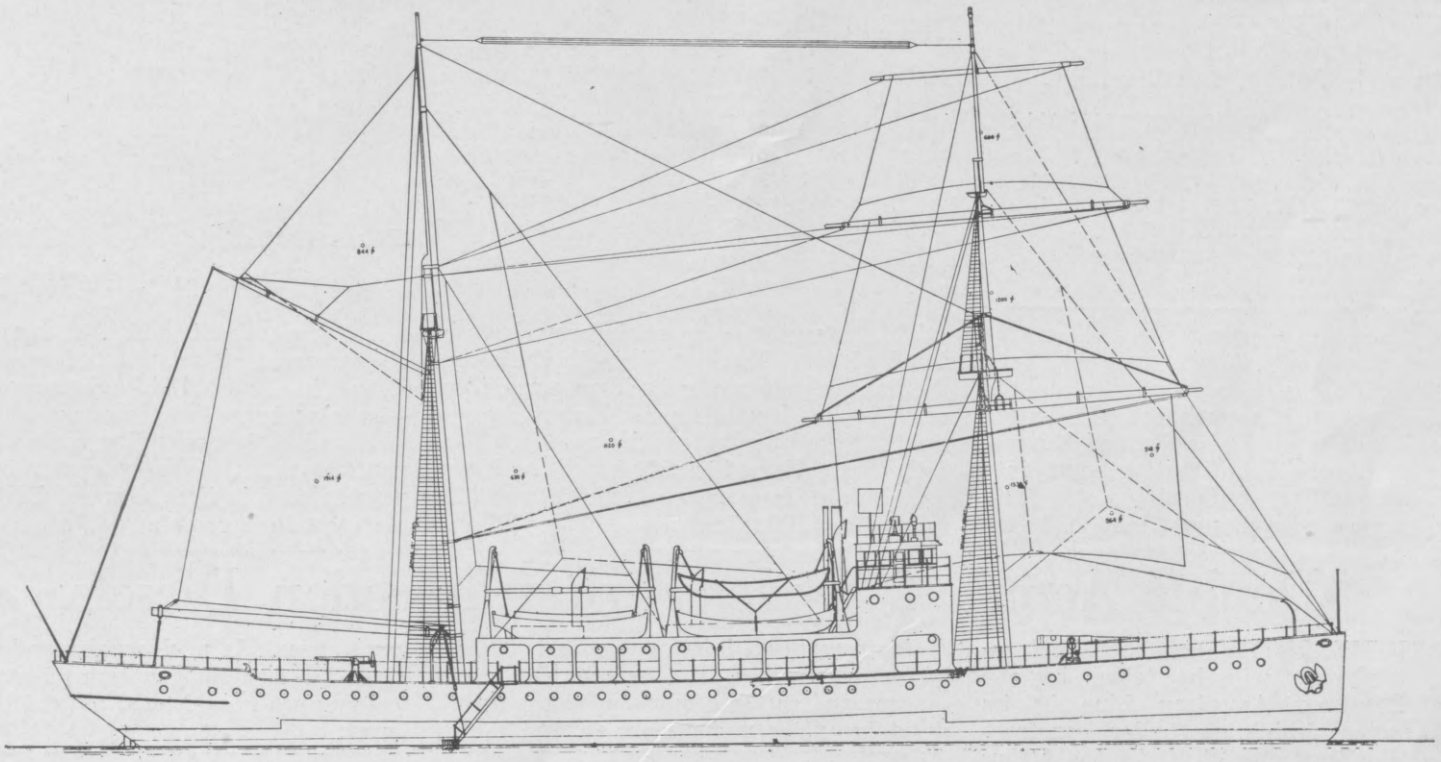
	Length B.p.	Beam Mld.	Depth Mld.	Draft	Hp.	Disp. Tons	Speed
NORTHLAND	200.0	39.0	24.7	15.0	1000	2050	11 kts.
NEWARK	220.0	28.0	——	7.0	1800	750	16 kts.

The above comparison is an extraordinarily interesting one. The fast "Hunt" class sloop—a twin screw 1800 hp. vessel—has 16 knots speed with 750 tons displacement. The NORTHLAND has 11 knots speed with 2050 tons displacement and 1000 hp. The "Tampa" class of International Ice Patrol sloops are 15-16 knot ships with much the same power as the NORTHLAND, but with considerably less displacement. These ships are turbo-electric ships with oil fired boiler but, from the general trend of Captain Newman's remarks, I imagine it is largely that weight question which has balanced the scale against Diesel electric propulsion. Many people will argue that it is unnecessary anyway to crowd electric propulsion of any sort into small light hulls . . . possibly it is, but remember what a very excellent flexibility you get in apportioning your main and auxiliary loads. Furthermore, with Diesel-electricity you get a far greater flexibility of control than with turbo-electricity because you can shut down generators as required. Turbo-electricity cannot do this.

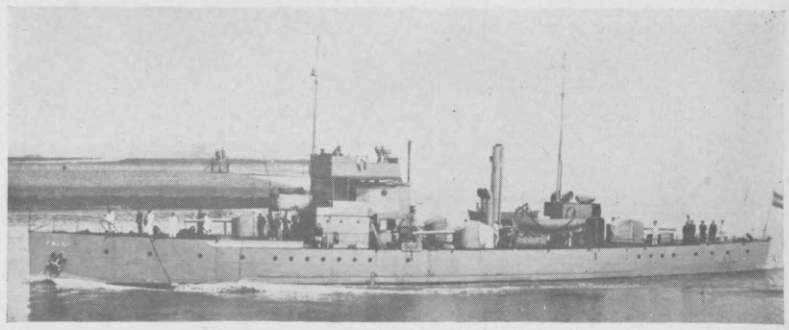
The port auxiliary load of a patrol ship is not very high. It cannot in any way be compared with that of a fast coastwise freighter which is the mercantile analogy to the sloop and this might appear to be a point in favor of straight Diesel drive on one or two shafts. For a ship attached to a squadron operating in the South Seas with long days of "motoring" between port and port, the merits of straight Diesel drive would appear to outweigh those of Diesel-electric drive, but for service around river estuaries and on ice patrol where distinct variations of speed are required for short bursts, electricity has much to recommend its use.

If straight Diesel drive is adopted, then here surely is an opportunity for designers to show what can be done in the way of a compact machinery space. No question of tonnage measurements need enter here because the ships are not mercantile ships. A great help in this direction is the elimination of spare auxiliary generators. One "port" generator is sufficient with a "sea" generator driven off the main engine or engines for use at sea, in conjunction with storage batteries. A 2-cycle airless injection engine with external scavenging has much to recommend it from the point of view of compactness, if the scavenge arrangements can be easily tucked away in the superstructure. If these are electrically driven, an increased electrical load is the result. If scavenge pumps are driven off the main engine or engines, engineroom floor space is absorbed. A 4-cycle airless injection engine, in the last analysis, appears to be the ultimate best for direct drive. The new Argentine ships, building by Hawthorn, Leslie & Co., are to have two 700 hp. Werkspoor 4-cycle engines. These will give her presumably about 1400 i.hp. and with a displacement of 800 tons the speed will be in the neighborhood of 13-14 knots. The "Hunt" class minesweepers with 750 tons displacement and 1800 i.hp. could make about 16 knots. These ships were designed after the bigger and heavier "Flower" class vessels and had, with their twin screws, extraordinarily fine maneuvering qualities. The "Flower" class were single screw ships with 2400 i.hp. and a designed speed of 17 knots. It would, in the main, seem better practice to design cruising sloops as twin screw ships both on grounds of maneuverability and . . . because they are, after all, warships. The "Flowers" were really of merchant ship design and were built mainly to merchant ship rules of construction. The "Hunt" class had water-tube boilers and high speed reciprocating engines reminiscent of the machinery of the old "30 Knotter" destroyers. The relatively high speed of Diesel engines cannot, logically, therefore be advanced as a point in their disfavor.

Advocates of sail, or rather those of us who have a sentimental regard for sail, may see in the Diesel driven sloop a possibility for the revival of sail. The NORTHLAND, the vessel for Arctic service to which we have alluded above, is square rigged on her foremast. Some of the earliest power driven sloops—of the British "Odin" class—prettiest ships that navy has ever seen—cruised almost exclusively under sail. Remember, however, that this step was a necessary one because the ships in question is in view of their comparatively limited coal capacity of just over 190 tons, were obliged to make long sea passages in this way. The motor sloop has, roughly, four times the endurance of the steam coal-driven vessel, and sailing rig, however, valuable for training purposes, does not



The U. S. Coast Guard Cutter Northland, built for Arctic service, is regarded as the forerunner of a number of Diesel propelled naval craft



An early expression of the small motor warship is seen in the 540 ton Dutch Gruno class of gunboats

somehow seem to fit in with modern requirements.

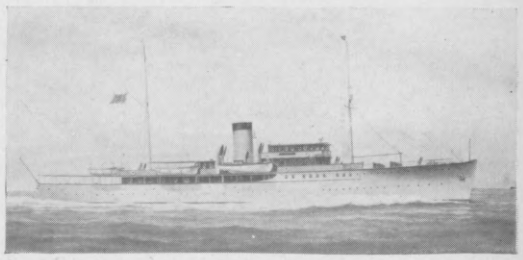
It would seem, from the above analysis, that there is a very definite field opening up for engines of Diesel type of up to about 1500 hp. per unit for the smaller types of naval craft as well as for auxiliary propulsion on big ships. But whereas, the big ship market is a comparatively limited one, and will be even more limited if naval armament limitations treaties come into force, the auxiliary and cruising ship field, for that very reason, must inevitably expand. America has paved the way for progressive thought in this direction with her fleet of 33 patrol ships. These new Argentine vessels are a further development.

Steam and Diesel Propelled Sloops

Ships	L x B x Draft	Tons Δ	Total Power	No. of Engines	Type of Mach.
Argentine	.....	800	1400	2	4-cyc. S. A.
Northland	200 x 39 x 15	2050	1000	2	4-cyc. S. A.
U. S. C. G.	120 x 24 x 7.7	220	300	2	4-cyc. S. A.
Yacht†	263.9 x 41.5 x 16.0	2700	3000	2	2-cyc. S. A.
Flower class.....	267 x 33.5 x 11.7	1250	2000	1	Triple - exp.
Hunt class.....	231 x 28.5 x 7.5	840	2200	2	Triple - exp.
Dutch Gunboat....	172.2 x 17.8 x 9.1	540	1500	2	2-cyc. S. A.

† The new Astor yacht—listed for comparison.

The above table is an informative résumé of what has been done in the sloop field and gives engine builders some idea of what lies before them. Unless a very light type of engine can be produced one feels that perhaps the 2200 hp. of the Hunt class might be somewhat difficult of attainment within the dimensions. There are, however, both here and in America numerous engines rated for 800 hp. and 700 hp. in six or eight cylinders. And notice also that the new Astor motor yacht (building in Germany) with about 4 ft. more draft and 450 tons greater displacement than the "Flower" class sloops has 3000 Sulzer horsepower, and —here's where the steamer goes right out of the picture—a cruising radius of 16,128 nautical miles. Yachts generally become patrol sloops in time of war. Diesel power increases their cruising radius.



A 3000 hp., 2700 ton motoryacht

Double Acting, 2 Cycle, Airless Injection Diesels

A NOTEWORTHY step in Diesel engineering will be taken by the Hamburg American Line in its three motor freighters under construction at the Deutsche Werft by the fitting of double-acting 2-cycle engines with airless injection of fuel. The problem of complete fuel combustion with airless injection, it is claimed, has now been solved for engines of any size by the Allgemeine Elektrizitats-Gesellschaft of Berlin together with Herr Hesselmann. A combustion chamber of special shape has been adopted, the piston being raised at the center so that when it is at the top of its stroke the clearance below the center of the cylinder cover is small. The pulverizer is placed in the middle of the cover and has five holes, which spray the fuel at an angle of 17 deg. into the combustion chamber and symmetrically round it. Effective penetration of the fuel in the combustion air is claimed to result, and the consumption with the test engine (for the 4-cycle type) works out at the low figure of 0.37 lb. per b.hp. hour. The fuel pump, pulverizer, and the filters are original in design, and in 4-cycle engines a special type of suction valve is employed, having a shield on the head, which causes the air to be given a rotary movement. The fuel valve has an extremely small lift, allowing very rapid closing.

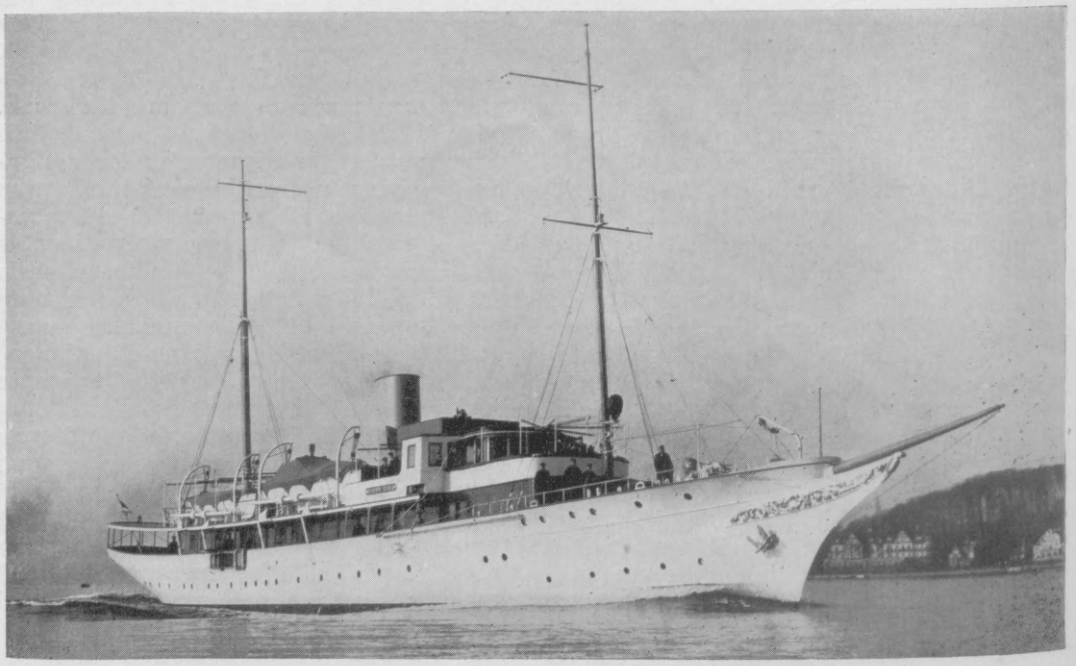
The new engines are 3-cylinder units and will generate 5,100 hp. They are simple, light and cheap, because the injection air compressor is omitted. Moreover, their fuel consumption is more favorable, as no power is required for driving the compressor and as the combusion in the cylinder takes place under more favorable circumstances. In medium size and small engines the fuel consumption of compressorless engines is said to be about 10 per cent. lower.

Motoryacht Happy Days

The Diesel yacht Happy Days, recently completed from Cox & Stevens' designs in a German shipyard for Mr. I. C. Copley of the New York Yacht Club, has dimensions as follows:

Length overall	196 ft. 0 in.
Length waterline	165 ft. 3 in.
Beam	27 ft. 0 in.
Draft	11 ft. 0 in.

She is equipped with two airless injection Diesel engines, giving her a speed of 14 knots.

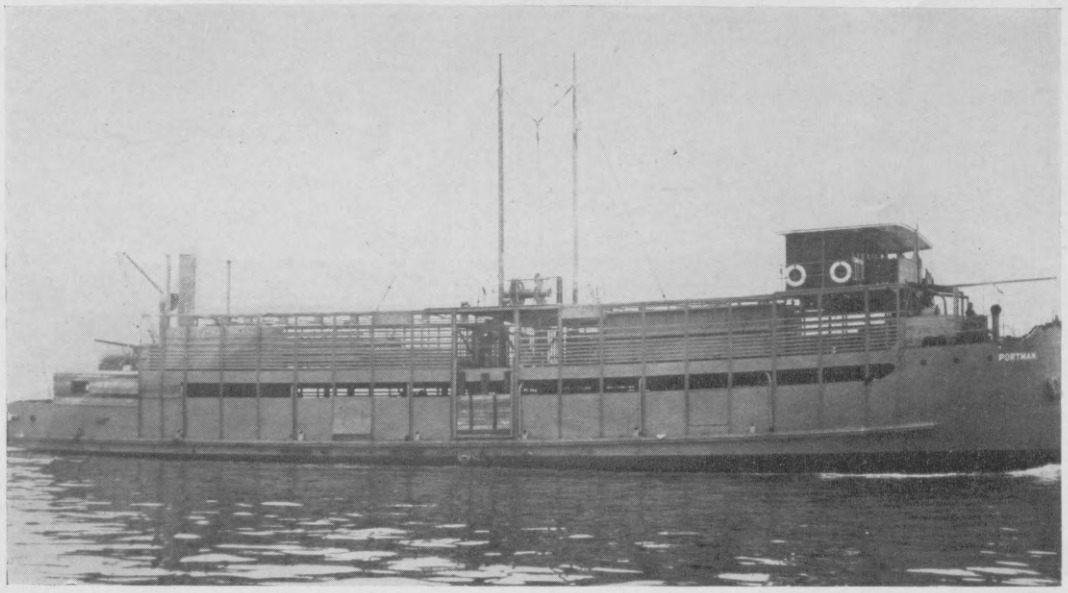


Motoryacht Happy Days, a 14-knot ship, combines speed with gracefulness

Motor Cattle Carrying Scow for Argentine

Craft, Reminiscent of New York Cattle Floats, Completed in British Shipyard for Argentine Service of Bovril, Ltd.

MS. PORTMAN, completed recently at the Southampton, England works of John I. Thornycroft and Co., is a twin-screw oil engine-driven cattle vessel for the Argentine estates of Bovril, Ltd., somewhat reminiscent of the cattle floats used in and around New York Harbor. With a length, b.p. 140 ft.; breadth molded.



Cattle carrier Portman has 160 *"surface ignition hp." and accommodations for* 500 *cattle*

34 ft.; depth, molded, 7 ft. 6 in.; draft load, about 5 ft. 6 in., she is arranged to carry about 500 cattle. She is powered by two Kromhout surface ignition oil engines of 80 hp. apiece. The vessel is built with a straight stem and transom stern, and has a short raised forecastle at the height of the upper deck. The bridge is arranged over the upper deck on a level with the awning. The vessel is framed on the transverse system with square chine and scantlings equal to Lloyd's requirements for river service. Four watertight bulkheads are fitted, one at each end of the machinery space, which is aft, one amidships, and one forward, forming the forepeak bulkhead. The cattle corrals are arranged on both main and upper decks.

Water troughs are arranged in suitable positions in the corrals, and are filled by pumps in the engine room. Spraying pipes are fitted overhead. A fore and aft passage way is arranged on the upper deck between the corrals of sufficient width to allow the passing of a man, and over these corrals a canvas awning is provided. Suitable fan trunking for ventilation purposes is arranged on each side fore and aft under the upper deck. Loading gangways are arranged amidships on each side of the vessel. These gangways are so arranged that they may be used for embarking or disembarking cattle from either the main or upper deck, the gangways being moved from one deck to the other by means of a winch fitted on the winch deck above the upper deck. When in position the outer ends of the gangways are also raised and lowered by this winch by means of tackle and bridle suspended between two pole masts, which are arranged just forward and aft of the gangways. Locking arrangements are provided for the inner ends of the gangways at each deck. The length of time occupied in moving the gangways from the lower deck to the upper deck or vice versa is only a matter of a few minutes.

Accommodation for captain and mate is arranged on the bridge deck. Engineers are accommodated in a steel house aft built over the motor room, and this house contains the engineers' cabin, fitted with two berths, settee, etc., a messroom fitted with a settee, table, etc., a galley, and a W.C. The crew is berthed forward under the forecastle, where accommodation is provided for twelve deck hands and mechanics. A locker is fitted up for each man, and mess tables, mess rack, etc., are provided. Hand steering gear is fitted on the bridge, and connected to the rudder head aft by means of rods and chains, with the necessary guides, etc. The wheel is of ample size for easy steering. A motor driven windlass is fitted on the forecastle deck. A fresh water tank to contain 100 gallons is provided, and two fuel tanks having a total capacity of about 10 tons are fitted on suitable supports in the engine-room, with all the necessary filling, air, sounding, and draw-off pipes. A 16 ft. dinghy is carried aft over the engineers' quarters.

The vessel is fitted with a complete installation for electric lighting and ventilating purposes, and the installation consists of a continuous current compound wound dynamo capable of maintaining the normal full load output of 100 volts pressure, and is direct coupled to a petrol-paraffin driven engine. The set is by Petters, Yeovil, England.

This engine also drives through clutch gearing a sanitary pump delivering 10 tons per hour against a total head of 30 ft., and the three machines are mounted on a combined baseplate of suitable design and fitted in the engine-room.

Diesel Ferries for New York

Two ferryboats for use in the institutional service of New York city were launched at noon on July 19 at the plant of the Todd Shipbuilding Co.

The ferries are Nelseco Diesel driven and are of 101 feet length, with estimated speed of 8 to 10 miles an hour. One will operate between City Island and Hart's Island and the other from East 134th Street to North Brother Island and Riker's Island.

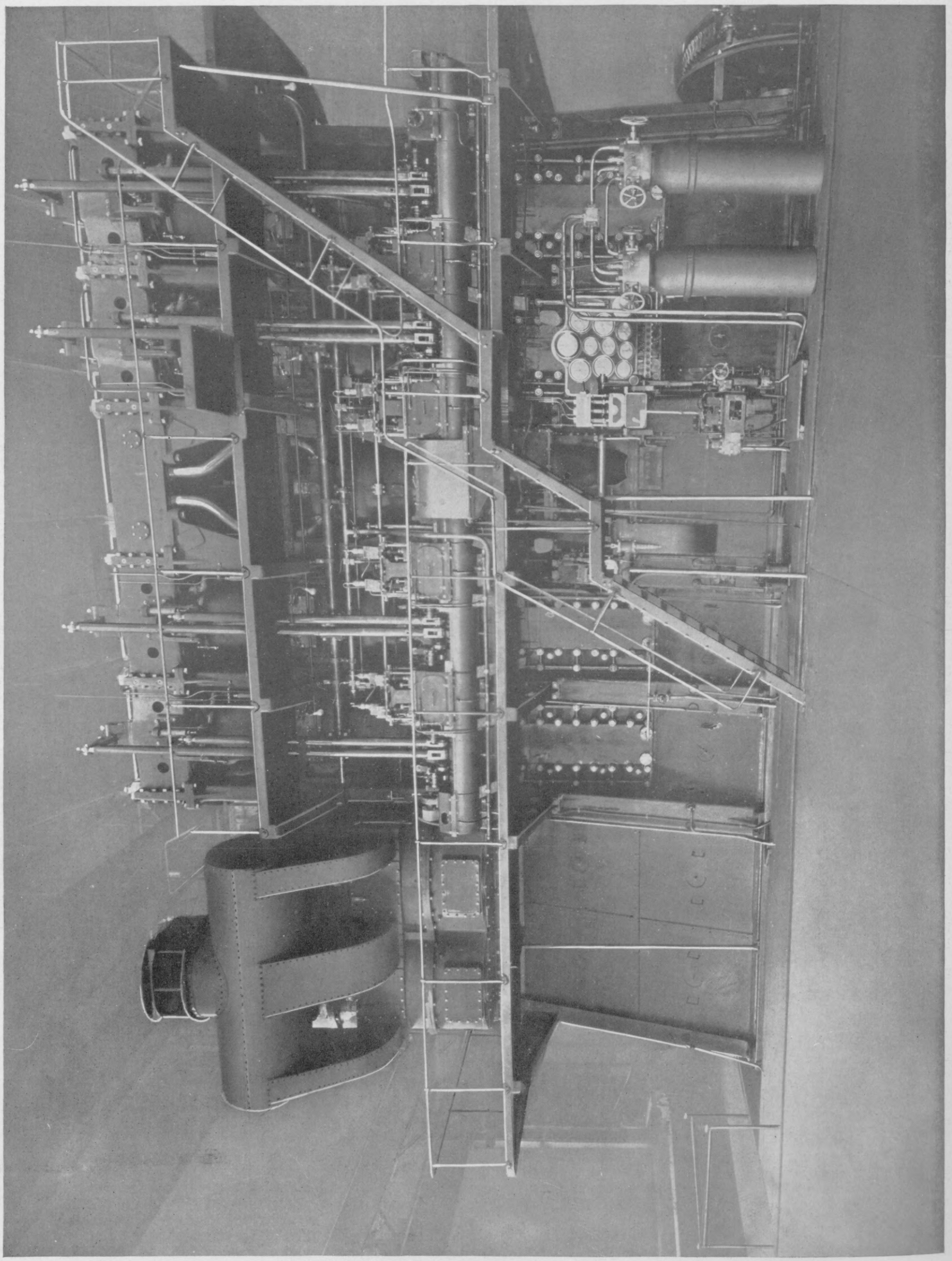
First of Three New Atlantic Refining Co. Tankers Completed

Ms. POINT BREEZE, first of the three new Diesel-electric tankers for the Atlantic Refining Company, was placed in operation July 25. This boat, which was originally called the J. M. CONNALLY, was reconditioned by the Atlantic Refining Company at its Point Breeze plant and, together with the other two, was purchased from the U. S. Shipping Board. The remaining boats, the SHARON and the BESSEMER, are being reconditioned by the Alabama Dry-dock & Shipbuilding Company at Mobile, Alabama, and are expected to go in service on September 15.

With the addition of these three boats, the Atlantic Refining Company fleet of Diesel-electric vessels will total nine, eight built or reconditioned in this country and the other abroad by the Scotts Shipbuilding Company, the latter utilizing electrical equipment supplied by the British Thomson-Houston Company. There are strong rumors also of further contracts.

The three new boats will probably operate in coastwise service, but may occasionally be used in foreign service between American ports and South Africa or Europe. Ms. POINT BREEZE is expected to carry lubricating oil while the other two will probably carry gasoline or possibly crude.

Each of the boats has a deadweight of 7000 tons. They were formerly operated by steam, but the new power plants each consist of Ingersoll-Rand Diesel engines and electric equipment furnished by the General Electric Company. Each tanker is equipped with three 850-hp., 225-r.p.m., Diesel engines, each driving a 525-kw., 250-volt generator for propulsion and a 50-kw., 250-volt auxiliary generator for excitation and ship's auxiliary power. The propulsion generators will supply power to an 1800-hp., 90 r.p.m. 750-volt, double motor on each boat, direct connected to the propeller shaft. The control will be of the variable voltage type arranged for operation either from the pilot house or the engine room, the control panels being of the dead-front type.



Many people regard the double-acting 2-cycle Diesel as the latest expression of the Diesel builder's art. Here is the latest U. S. Diesel of this type, the double-acting 2-cycle Nelseco unit, which developed 3680 b.hp. at 115 r.p.m. on the Shipping Board's 30-day endurance test

Nelseco–M.A.N. Double-Acting 2-Cycle Diesel*

Shipping Board Engine Developing High Power During 30 Days Non-Stop Run Follows Design Successfully Developed in Germany

WITH the advent of the double-acting Diesel engine, a progressive step has taken place in the application of the internal combustion engine for seagoing ships of all types and sizes. Shipowners, who are at all conversant with the increasing success of motorships, have doubtless realized that sooner or later they will have to utilize the Diesel engine in their fleets. Some have possibly been deterred from taking this action by the initial investment required, others through lack of informaion on the subject, and still others by the belief that the large slow speed Diesels were passing through an evolutionary stage in type and design.

The single acting Diesel engine has operated on the high seas for many years with great satisfaction to its owners. These engines have thoroughly proven the reliable operation of motorships and have effected large annual savings. Competitive conditions, however, demand ships of greater earning power, which in turn means more deadweight tonnage and cubic capacity, when considering hulls of similar characteristics. The attainment of additional carrying capacity necessitated a reduction in the total weight of the propulsive machinery. These advantages could only in the opinion of many people be obtained in the highest degree by the application of the double-acting principle.

The engine built by the New London Ship & Engine Company at Groton, Conn., represents the latest development of the double acting 2-cycle engine in this country. It develops 3680 s.hp. at 115 r.p.m. and is of the 4 cylinder, air injection type with scavenging pump attached. Combustion takes place above and below the piston in each cylinder during every revolution, resulting in the smoothest possible flow of power through the crankshaft. One can readily appreciate that the 2-cycle, double-acting type represents a very high development of the internal combustion engine as it is obviously possible to obtain a greater number of combustions from one cylinder during a revolution with this type than with other types.

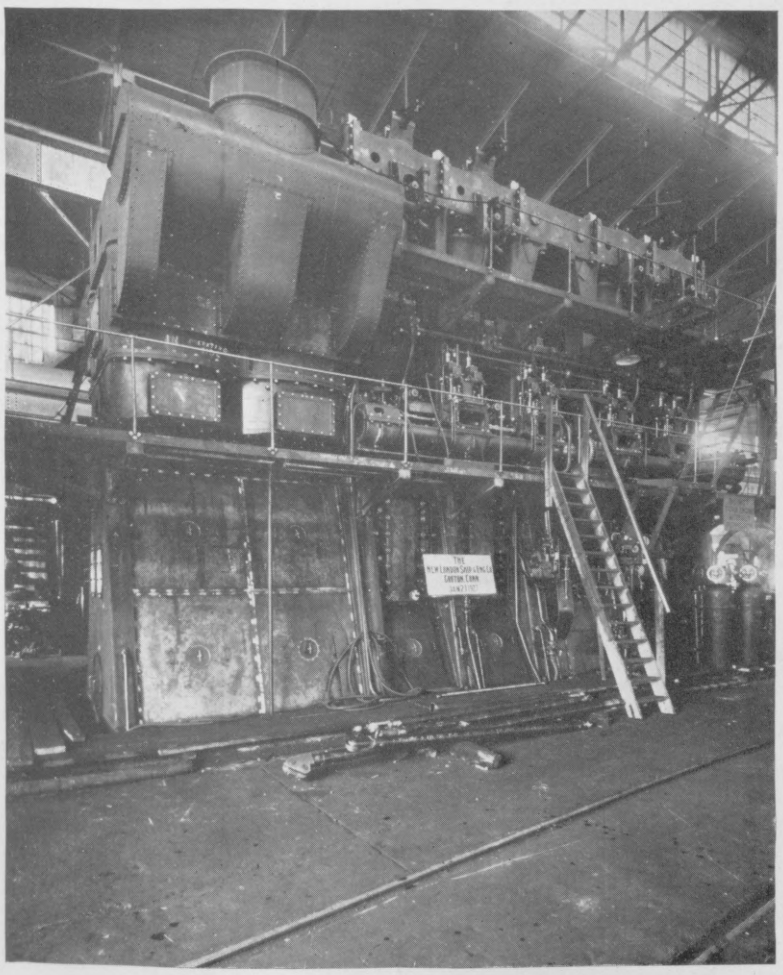
The engine has just completed a 30-day non-stop full load test carried on under the supervision of representatives from the United States Shipping Board, to whom the engine will be delivered. During this run, the engine developed a continuous output of 3680 b.hp. at a speed of 115 r.p.m. The length of the test was selected in order to compare with the longest sea run which Shipping Board vessels are called upon to make. It is interesting to note that this run constitutes the longest test which a commercial engine of this size has ever completed in this country without a stop.

A brief review of the original design and development of the first large double acting Diesel engines is of interest, inasmuch as it illustrates the long and painstaking efforts devoted to the attainment of this type of prime mover.

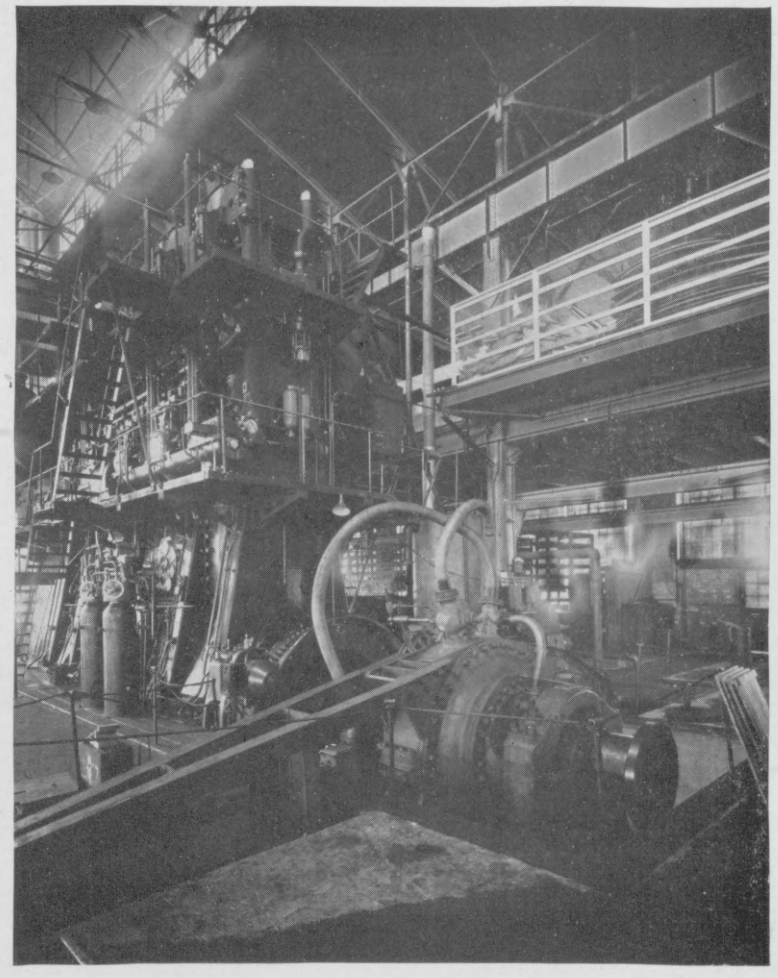
Early in 1911 the Maschinenfabrik Augsburg Nurnberg, A. G., of Augsburg, Germany, who were the pioneers in the development of the Diesel engine and are the licensors of the New London Ship & Engine company, undertook the design and construction of a 6 cylinder, 2 cycle double acting engine to develop 12,000 s.hp. This engine was to the account of the German Admiralty for use in a light cruiser. Due to the unusual nature of the order, M.A.N. first constructed a single experimental cylinder of 2000 hp., which was the basis for their design of the larger engine. After due tests and experimentation the 12,000 hp. engine, at that time the largest Diesel engine in the world, was finally finished and successfully passed tests at the M.A.N. Nurnberg shops. The intervention of the World War delayed the development of similar units and it was not until 1920 that the M.A.N. Company again took up the construction of other large 2 cycle double acting engines. Convinced that they could improve on the 1911 effort, they again

(*Continued on page* 627)

*Article written by the Technical Department, New London Ship and Engine Co.



The Nelseco double-acting 4-cylinder Diesel during construction



Heenan & Froude water brake used on 30 days non-stop test

Coastwise, Diesel-propelled, and Fast

Ms. Minnipa, 14¾-Knot Passenger and Freight Carrier Now on S. Australian Seaboard, Shows Economy Over Steamers

IT is practically a direct refutation of the opinion expressed by many opponents of the Diesel propelled ship of the motorship being expensive on short haul runs because it spends long periods in port, that the Australians continue to add such vessels to their coastwise services. Australian coastwise problems are very similar to those of the U. S. Distances are much the same. Special restrictive coastwise navigation laws are in operation. All types of tonnage are in operation, from fast 16 knot passenger ships to small ships corresponding to the British coaster type . . . A discussion of the applicability of Diesel engines to such ships was incorporated in the third article of our series entitled "Motorshipping Marks New Era in Sea Transportation Business" published in the July issue of MOTORSHIP. The diversity of types now in service is well representative. Note, too, that the engine sizes are all well within those produced easily and cheaply by domestic engine builders, who would do well to impress upon coastwise shipowners the economy which such installations will give them.

Ms. MINNIPA, briefly alluded to in our July issue, is a single screw ship of passenger-cargo type specially designed and built in Denmark at the Burmeister and Wain plant for the Adelaide SS. Co. for service between S. Australian ports.

Ms. MINNIPA is powered by a single 8 cylinder B. & W. crosshead Diesel of 24½ in. cylinder diameter by 51 in. stroke. On trial the engine developed 4278 i.hp. at 149 r.p.m. and gave the ship a speed of 14.94 knots. Three 66 kw. generators supply power for the whole of the auxiliary purposes on the ship. The main engine pierces the main deck in a narrow trunkway, as the illustration shows.

The hull is constructed to Lloyd's highest class and the ship complies with the Board of Trade and Australian Navigation Act requirements. The ship is built with a continuous cellular double-bottom which has been raised in the engine room to form part of the engine seatings. Tank No. 1 is arranged for water ballast and fresh water as well as the fore and aft peak. No. 3 tank for fresh water only. No. 2, 4 and 5 tanks are for fuel oil. The fuel oil capacity in the double-bottom is 230 tons. The centre part of the double-bottom tank in the engine room is arranged for the carriage of lubricating oil.

Characteristics of Ms. Minnipa

Length between pp.	252 ft. 6 in.
Breadth molded	39 ft. 9 in.
Depth molded to shelterdeck	24 ft. 3 in.
Gross tonnage	1976.5 tons
Net tonnage	964.3 tons
Capacity of holds	70.270 cu. ft., (bale)
Speed	14¾ knots
Power	about 3000

Map shows 200 mile night route of Ms. Minnipa

There are three holds, two forward and one aft of the engine room. There is one hatch for each hold together with a trunk hatch from boatdeck on the after side of No. 2 hold. The hatch to No. 3 hold is trunked through the shelterdeck. Modern equipment is fitted for rapid loading and discharging cargo. Two 3-ton steel booms are fitted for each hatch together with a 20-ton derrick at No. 2 hatch and two 1½-ton cranes for the trunk hatch on the boat deck.

All deck machinery is electrically driven. The winches at the after hatch are arranged for warping. Large cargo ports are fitted to the main deck forward, one on each side of the ship, being large enough for automobiles of ordinary size to pass through. Horse stalls, four at each side, are arranged on the main deck abreast No. 2 hatch. Hinged flaps forming the tonnage openings are fitted on each side of the ship. All the weather decks are of teak. The windlass is electrically driven and fitted with gear for working by hand power when required. The steering gear is of the electric hydraulic type placed in the after deckhouse on the shelter deck. The steering gear is actuated by telemotor gear from the bridge. In addition to the hand steering gear, which is fitted on the boatdeck aft there is an emergency dynamo fitted in the steering gear room. Two refrigerated chambers are fitted in No. 2 hold underneath the trunk hatch, having a total capacity of about 1900 cu. ft.

A café is situated forward of the engine casing in the saloon deckhouse on the shelterdeck. It is finished in polished birch and has a seating capacity of 48 persons. Chairs and tables are arranged and there is a piano. A staircase in polished mahogany and birch at the back of the saloons leads down to the cabins below and to the boat deck above. Large windows are fitted at front and sides giving the neces-

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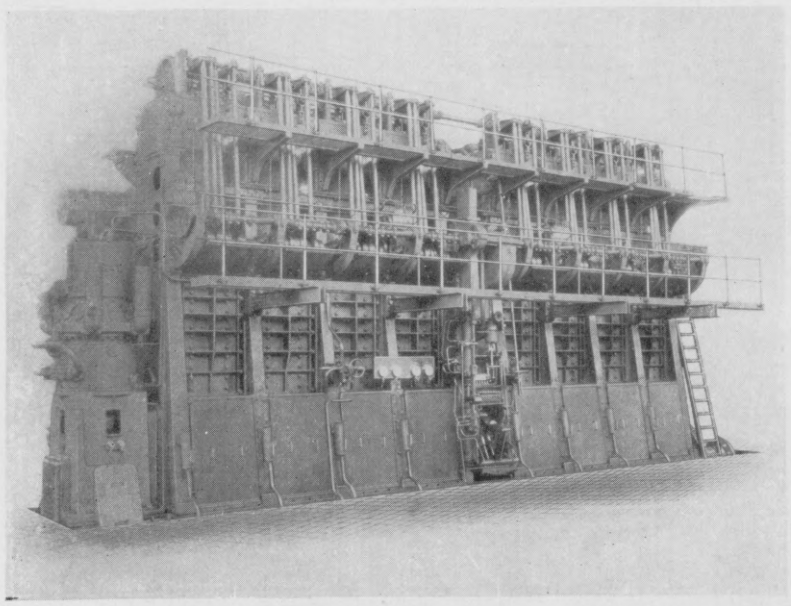
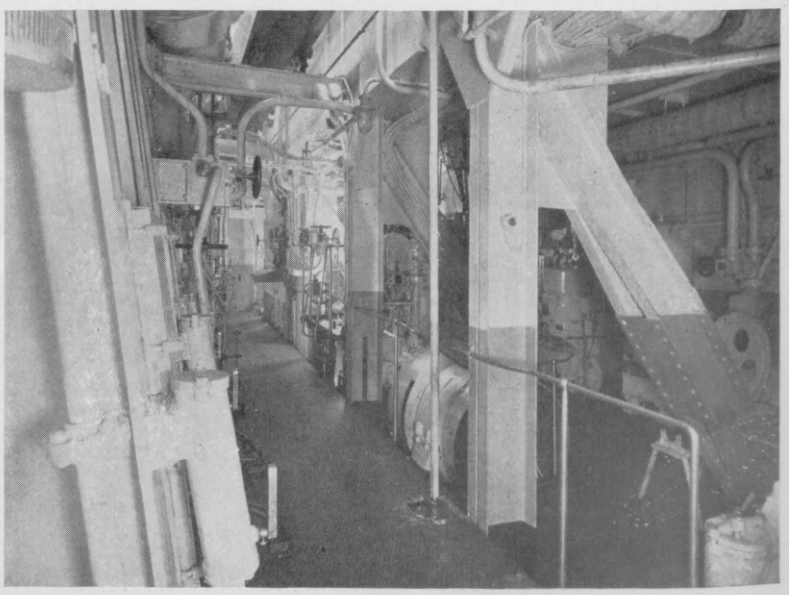


The 8-cylinder 4278 hp. B. & W. long stroke Diesel



Port side of Minnipa's compact engine room

Broad deck space from aft end

Main deck abreast bridge house structure

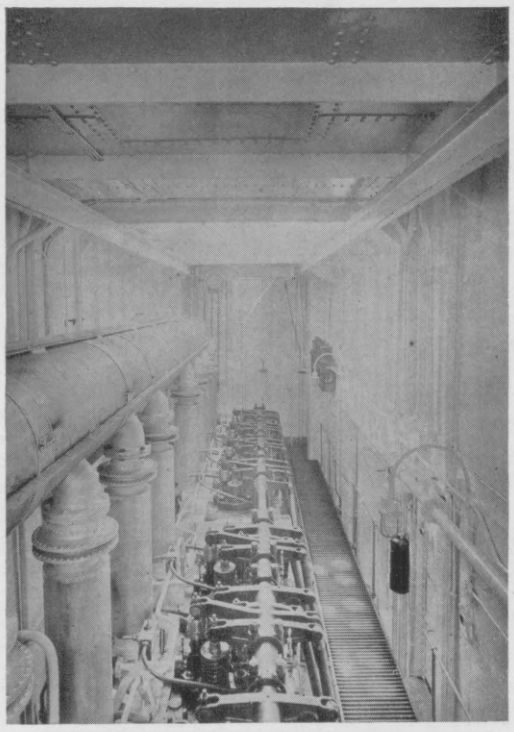
Coastwise Diesel Propelled and Fast

(*Continued from page* 620)

sary light to the saloon. As the ship is designed for night service as well as day service the sofa seats and backs can be converted into sleeping berths, thus providing sleeping accommodation for 20 persons.

The smoking saloon is situated aft of the engine casing on the shelterdeck. It is finished in polished mahogany, and has 20 table seats. A small bar also finished in polished mahogany is arranged in conjunction with the saloon. The sofa seats and backs are arranged similarly to those in the café thus providing sleeping accommodation for 20 persons. The floors in both saloons are covered with tiles in shades of different colors. Outside the smoking room on the aft end a small verandah café is arranged with two tables and two sofas similar to the sofas in the saloons with sleeping berths.

The deckhouse aft on the shelterdeck is arranged to house staterooms with two berths each, a hospital with entrance from deck and 6th and 7th engineers cabin. The entrance hall has two sofa seats making four sleeping berths. A staircase of polished mahogany leads to the



Narrow trunkway for engine top and exhaust header piercing main strength deck of ship

cabins below. It is of good proportions.

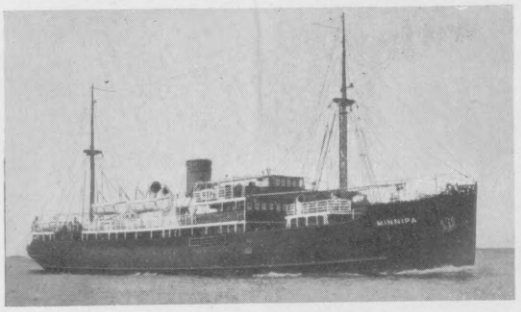
The staterooms are situated chiefly on the main deck and partly on the shelter and boatdeck. There are 25 4-berth cabins arranged abaft No. 2 hold to the stern, and also 17 2-berth cabins. Men's and Ladies' lavatories are arranged on the maindeck on the side of the casing and the bath rooms at centre abaft the engine casing. Accommodation for stewards, stewards store, and wine locker is arranged aft on the maindeck partly in the counter.

The staterooms are finished in white enamel. Berths are of white enamelled iron with the upper berth arranged to fold up. The remaining cabin furniture consists of hardwood seats and compactive wash stands. The corridors are finished in white enamel and polished mahogany thus making the corridors very light. A sufficient number of side corridors are arranged to give as much light as possible. Washstands are fitted at the end of the side corridors with grained marble top plate.

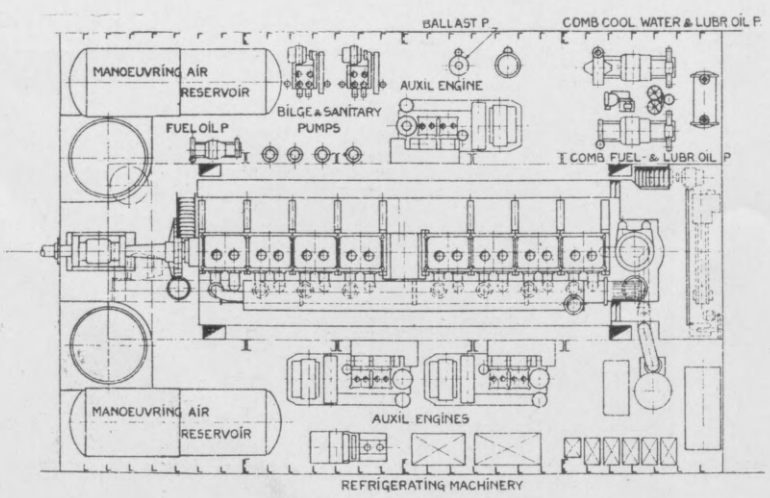
The remaining cabins are arranged in houses on the boat deck. Two 2-berth cabins in the wireless house aft of the engine casing and two 2-berth and four 4-berth cabins in the house forward of the engine casing and trunk hatch. This house also contains the staircase from café to boat-

Comfortably fitted-out smoking lounge

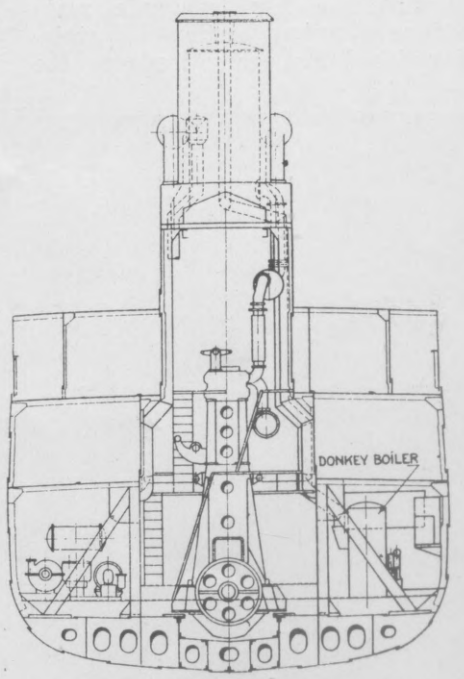
Simple but comfortable decorations characterize the cabins



Ms. Minnipa, a 14¾-Knot, 4278 hp., 1975 Ton Gross Coastwise Passenger Ship



Plan view of machinery



Section in way of machinery space

deck. On top of this house is the flying bridge and a house with accommodation for manager, captain and officers.

Men's lavatory on main deck portside is fitted with four showers and ladies' on starboard side with one shower. The water closets are of the double-valve type with supply from the sanitary tanks on top of casing. The wash stands have cold fresh water supply. All bathtubs have cold and hot salt water supply and the showers hot and cold fresh water supply. The crew are berthed forward on the maindeck and on the shelterdeck in the forecastle.

The saloon pantry is placed abaft the café extending right across the deckhouse with serving windows to the café on each side of the main staircase. An electric hot-press is fitted below the one serving window. Lockers and shelves neatly arranged and finished in hardwood. A bar is arranged adjacent to the pantry. The galley is abaft the pantry on portside of engine casing. The equipment is all electric—stove, water boilers, etc., and of the most modern type.

Purser's, stewards' and engineers' as well as officers' messroom and bathroom are arranged on both sides of the engine casing on the shelterdeck. Two fresh water tanks of 5 tons each are fitted in the after hold at after end of engine room.

All the saloons and corridors are ventilated naturally as well as artificially by means of specially constructed ventilators fitted to each cabin under deck and torpedo ventilators to each cabin above deck. Large ventilators of the uptake and downcast type are fitted in corridors and saloons. The artificial ventilation is carried out by horizontal electric fans fitted under the ceiling in saloons, etc.

The casing sides are efficiently insulated in inner side thus minimizing the noise and heat from the engine room. The horse stalls on maindeck forward as well as the whole space is well ventilated by having sparred covers in hatch No. 2 on shelter deck. The ship is electrically lighted throughout. Current at 110 volts is delivered from dynamos coupled direct to the auxiliary Diesels. The main switch board is fitted in the engine room, the main cables being led to distribution boards placed in convenient position to suit the arrangement and to facilitate operation.

All binnacles, telegraphs, navigation lamps, etc., are electrically lighted. A wireless station of 1½ kw. capacity is fitted in deckhouse on boatdeck. Awnings are fitted over all parts of the ship. Side curtains are fitted to the whole length of the promenade. The ship is provided with self-levelling step accommodation ladders.

There are four lifeboats on the boatdeck amidship and two lifeboats on the boatdeck aft, all to British Board of Trade requirements. Sufficient number of buoyancy seats approved by Board of Trade are arranged in different places on boatdeck amidship and aft. The davits are of the Welin patent type. A feature of the ship is the careful construction of the engine seatings to avoid vibrations.

The equipment, fittings, machinery, etc. of the vessel throughout are of up-to-date type, and have been designed with all modern labor-saving devices thereby securing great economy and decrease of necessary working hands on board, both on deck, in engine room and accommodation.

Ms. Minnipa is an important vessel with a very definite American application.

Japan Operating Fast Coastwise Motorship

YET another country is seriously determining to try out the possibilities of the fast coastwise motorship, of the type discussed in our July issue. A new motorship service between Tientsin and Japanese ports has been started, and a 6-day sailing schedule is planned by promoters of the line, it is stated.

The motorship CHOJO MARU which arrived at Tientsin from Japan recently was the first motorship to enter the port of Tientsin on a regular sailing schedule. CHOJO MARU will be followed by two sister motorships owned and operated by Osaka Shosen Kaisha. They were constructed in Japanese shipyards, and are fitted almost entirely with Japanese equipment. Their dimensions are: length, 284 ft. 6 in.; beam, 45 ft. 6 in.; depth, under decks, 23 ft.; draft, maximum, 17 feet; gross tonnage, 2,600 tons; cargo capacity, 2,900 tons; passenger capacity, cabin, 38; steerage, 87; speed, 15 knots; motive power, one Sulzer Diesel. They have a refrigerator cargo space, 40 measurement tons and cost, approximately $564,000.

Osaka Shosen Kaisha plans to put into effect a six-day sailing schedule from Tientsin to Japan ports in June. The voyage from Tientsin to Kobe via Moji and Osaki, will require three days. The sailing schedule has been arranged so that convenient connections can be made at Kobe with transpacific steamers and motorships.

These ships should be carefully watched for performance by American Shipowners.

Nelseco-M. A. N. Double-Acting Diesel

(*Continued from page* 619)

built a single experimental cylinder and carried on extensive tests in the perfection of details in design and construction. The result of this effort was the placing of an order with M.A.N. from the Hamburg Electric Company for a 15,000 b.hp., double-acting 2-cycle engine. This engine of 9 cylinders is the largest Diesel engine in the world and is now operating in Hamburg to the entire satisfaction of its owners.

Simultaneously with this development, M.A.N. began receiving large orders for marine service. Prominent among these is the motorship AUGUSTUS built in Italy by Cantieri Officine Savoia. This ship is a passenger liner of the most modern type, equipped with quadruple screws, each propeller being driven by a 7000 s.hp. double acting 2-cycle engine. Other orders received by M.A.N. during 1926 included two 5400 hp., 7 cylinder, double acting 2-cycle engines to be installed in a freighter for the Hamburg Amerika Line. Also two 5 cylinder engines of the same cylinder size and developing 3750 hp. for single screw freighters of the same company. The North German Lloyd of Bremen have contracted for a 6 cylinder unit, developing 4600 hp., which will be installed in a freight carrying vessel.

Recent orders received include two large stationary engines, each rated at 11,700 b.hp., both of which will be installed in the Maerk Power House, Berlin. Three smaller units, developing 2230 hp. each, have been contracted for in Russia and will be installed in the Stalingrad Iron Works. The Rotterdam Lloyd of Rotterdam will install in their new passenger ship, the KOTA GEDE, a 7 cylinder 5200 b.hp., 2 cycle double acting engine. The Hamburg Amerika Line have placed an order with the Bremer Vulkan for a 17,000 ton freight and passenger ship in which will be installed four M.A.N. double acting engines.

The motorship BRAUNFELS has recently undergone her trial trip and is now at sea. This ship is equipped with a 4000 b.hp., 6 cylinder, 2 cycle double acting engine.

The above list is not entirely complete and represents only a partial list of 2-cycle, double acting engines now under construction by the M.A.N. Company and its licensors throughout the world. It illustrates, however, something of the reception which this design and type has received, both in Europe and in America. Offering as it does, marked advantages in the reduction of weight and space and also in manufacturing costs of the engine proper, it is evident that this type will greatly appeal to ship owners who are desirous of equipping their vessels with the most modern and economical type of Diesel engine for large ocean going vessels.

The 3680 s.hp. Nelseco 2-cycle, double-acting engine, will be installed in the steamer WILSCOX. This ship is of 9500 dwt., and was originally fitted with a 2800 i.hp. steam engine. She is of the Oscar Daniels type and was built at Tampa, Florida. The additional horsepower will, it is expected, give more speed than the ship developed formerly.

Roosevelt Motorships

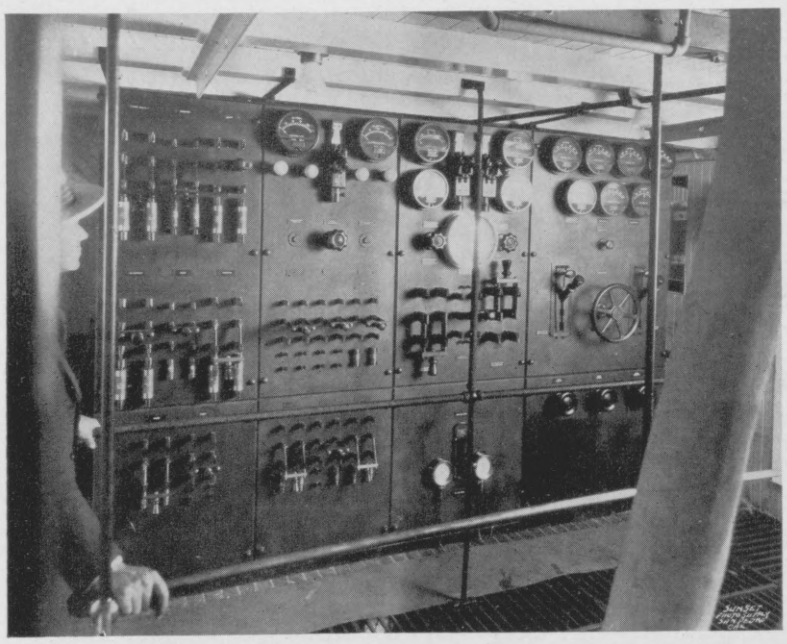
Roosevelt Steamship Co., announces that owing to the late delivery of the motorship SAWOKLA, that vessel has been placed on the Indian berth for a round voyage and was scheduled to sail from New York July 27. It was originally intended to place her on the Australian berth, where she will go when she returns from India. Moore & McCormack, Inc., Philadelphia agents of Roosevelt Steamship Co., also announced that beginning July 18 the American India-Atlantic-Australian Line will make Philadelphia a regular port of call for its Australian boats. Under the schedule as now announced at Philadelphia, three of the Roosevelt ships will arrive at Philadelphia every month.

The 95 ft. Diesel-electric tug John N. Stewart has two 300 hp. Winton Diesels and is one of the most powerful and well equipped tugs on the West Coast

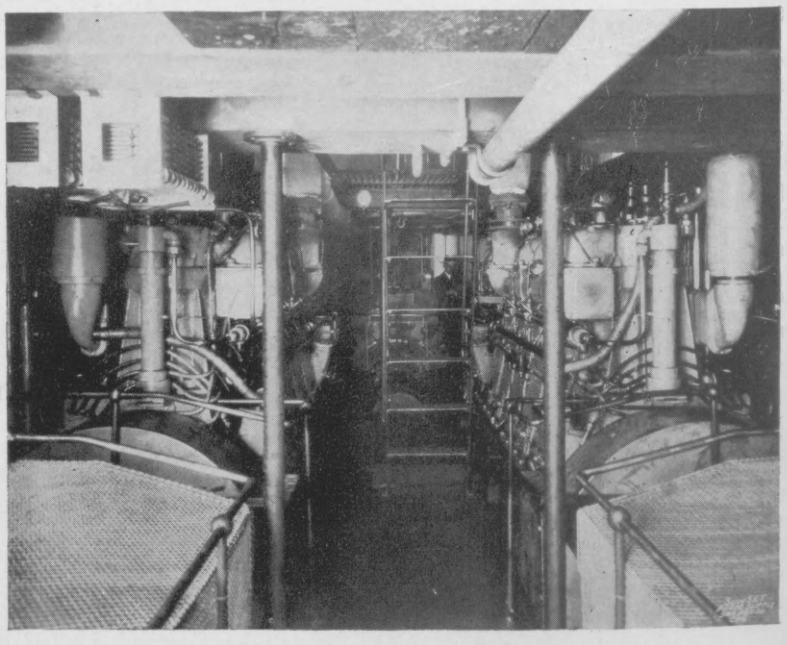
A Fleet of Big Diesel and Diesel-Electric Tugs for the Pacific Coast

Tug Louie Black powered by one 400 hp. Winton Diesel

Tug Milton S. Patrick has electric drive



Main switchboard of tug John N. Stewart



Two main 300 hp. Wintons coupled to generators

"Flexibility Combined With Ease of Control"

Wilmington Transportation Co., Wilmington, Cal., Takes Delivery of Its Fifth Large Diesel Propelled Tug With These Characteristics

"FLEXIBILITY and ease of control are the features which have made Diesel-electric propelling desirable for our work," is the reason for the choice of Diesel and of Diesel-electric drive for the big tugs of the Wilmington Transportation Co., Wilmington, Cal.

One of the most impressive sights that the Los Angeles harbor has witnessed for some time was provided upon the occasion of the trial trip of the new Winton powered towboat LOUIE BLACK, built by the William Muller Shipyard, Wilmington, Cal., and owned by the Wilmington Transportation Company, one of William Wrigley's many Pacific Coast interests. As the new boat went down the channel on her first trip to sea, four other Wrigley towboats, MILTON S. PATRICK, JOHN N. STEWART, DAVID P. FLEMING, and D. M. RENTON, all Winton powered boats, swept along in her wake. The MILTON S. PATRICK and JOHN N. STEWART are Diesel-electric ships with Westinghouse electric machinery but the LOUIE BLACK has direct Diesel drive. The fleet comprises one of the finest and most up-to-date towboat fleets on the West Coast.

In general design, all five boats have much the same arrangement, except that the LOUIE BLACK has her stack close up against the pilot house. Further differences between ships and ships are shown in the table given above.

Wrigley Motortug Fleet Details

	LENGTH	BEAM	DRAFT	ENGINES
LOUIE BLACK	86.5 ft.	24 ft.	11.5 ft.	1–400 hp. Winton
MILTON S. PATRICK	95 ft.	22.5 ft.	12 ft.	2–300 hp. Winton (Electric Drive)
DAVID P. FLEMING	85 ft.	17 ft.	10 ft.	1–350 hp. Winton
JOHN N. STEWART	95 ft.	22.5 ft.	12 ft.	2–300 hp. Winton (Electric Drive)
D. M. RENTON	85 ft.	17 ft.	10 ft.	1–350 hp. Winton

The two Diesel-electric towboats of the fleet were actually the first Diesel-electric tugs on the West Coast and their completion last year marked an important step in West Coast shipping.

Engine room equipment on each ship consists of two Winton Diesel engines of 300 hp. at 450 r.p.m. directly connected to Westinghouse generators of 175 kw. The propelling equipment consists of one Westinghouse double armature marine type motor of 450 hp. at 130 r.p.m. turning a Lambie propeller 8 ft. 6 in. diameter by 8 ft. pitch.

Control is on the Ward Leonard system with pilot house control. There are three control stations, two in the pilot house and one aft on top the engine house. The steering is both electric and hand, the electric gears being designed and built by Allan Cunningham of Seattle, Washington. Deck equipment consists of one Allan Cunningham warping winch forward, with a two-speed Cunningham capstan on the starboard side aft.

The Captain's room is aft of the pilot house, the Chief Engineer's room being on the port side on the main deck. The galley is equipped with a Westinghouse electric range.

Diesel Tugs on French Inland Waterways

VERY satisfactory results have been obtained in France by the National Office for Navigation with small Diesel tugs operating on the big inland waterway systems of the country. These tugs have been built under the Reparations Scheme (Dawes Plan) by the Triton-Werft, Duisburg (Germany) and the Diesels have been supplied by the Motorenfabrik Duetz A. G. Each of the tugs is fitted with a solid-injection 2-cycle 40 b.hp. Deutz engine, running at 340 r.p.m., the propeller being driven through reduction gearing at 94 r.p.m.

The chief advantage claimed in connection with these small tugs is that only one man and a boy need be on board, thus cutting down wage charges.

In the course of a consumption trial on one particular tug when fuel of about 32 deg. Beaumé was used, the speed being 340 r.p.m., the total consumption worked at 6.97 kg. per hour.

A speed trial on the Rhine carried out by the same tug showed speeds as high as about 7 miles per hour up stream. In smooth water, speed is about 12 miles per hour.

Following these satisfactory trials, the Motorenfabrik Deutz A. G. have developed a 100 hp. engine to run at 100 r.p.m. only and also a 40 hp. engine to run at 100 r.p.m. Such low speeds have not so far been obtained with Diesel engines built in France.

Special interest attaches to the attention paid by the National Office of Navigation—that is placed under the control of the Ministry for Public Works—to the application

French 100 hp. Inland Waterway Tug

of Diesel-drive to inland navigation in France. Very similar problems exist in this country also.

Atlas-Imperial Representation on East Coast

We are able to announce that the New York branch of the Honolulu Iron Works, 165 Broadway, have been appointed representatives in the eastern territory of the United States for the Atlas-Imperial Engine Co. of Oakland, Cal., for their marine, stationary and auxiliary Diesel engines in sizes from 30 to 400 b.hp. A new department has been formed which will be known as the Diesel Engine Section, with Mr. K. H. Nilsson as Manager. Mr. Nilsson is well known in the oil engine industry, having been in charge of the marine and stationary oil engine sales in New York and Boston for the Bolinders Company for more than twelve years.

In acting as Atlas-Imperial distributors for the eastern states the Honolulu Iron Works will be in position to furnish spare parts as well as to service all engines which are placed in service in this part of the country. They are thoroughly familiar with the Atlas-Imperial engine, the head offices in Honolulu having acted as Atlas-Imperial engine representatives for some years.

Bids for District of Columbia

Standard Oil Company has issued specifications for the conversion of the tanker DISTRICT OF COLUMBIA, recently purchased from the Shipping Board. Bids will be opened on August 1 for the work of conversion. Unusual interest is aroused in the work, because equipment will be fitted to make the vessel the largest Diesel electric-propelled ship in the world. Westinghouse electrical machinery will be used throughout, and the Busch-Sulzer Company is supplying the four 1000-hp. main Diesels.

Arrangements have recently been completed by the Willamette Iron & Steel Works, Portland, Oregon, to manufacture the Sumner oil engine for the H. W. Sumner Company.

Pyrometer Installations on Motorships

The Fitting of Pyrometers to Marine Diesel Installations Is a Matter for Careful Selection and Intelligent Adjustment

IT is difficult to recall who sounded the first warning against buying a pig in a poke. No matter.—We have listened to it and we believe in it. Now it seems that some people apply it to pyrometers for motorships. However, the old saying should not prevent us from pulling the drawstring and having a look at the pig. That is precisely what we should do in the case of pyrometers and in so doing we will learn that they are superior to any other method of heat measurement.

But before we do this let us understand that no matter how well the pyromter is made and how fine the equipment that goes with it, if it is not installed properly and maintained as it should be, it will not give satisfaction. In a due course of time carelessness in this respect will reveal itself in the instrument which will fail to function. In the majority of cases where trouble has been reported to service men in the employ of pyrometer manufacturers, they have found that the trouble lay in having the thermo-couple improperly protected and burned in consequence, or the wiring improperly installed and grounded. Therefore, if the best service is to be obtained with these instruments only the very best installations possible should be made. Let us not confuse marine work with land work where cheaper installations are sometimes justified.

Pyrometers will measure much higher temperatures than thermometers, but since these latter cover a range great enough for most Diesel work the advantages of the former are not confined to their wider range alone. Dependability and low maintenance costs are factors.

The theory of thermo-electric pyrometry is not new. In 1821 Seebeck discovered that if two wires of dissimilar metals were joined at their ends and these ends were heated, while the cold ends outside of the heat were connected to a sensitive volt-meter the instrument would show that an electric current flows in the metallic circuit. As the temperature at the hot end changes, the magnitude of the electric force also changes, thus the temperature may be read with a millivoltmeter, which is graduated in degrees of temperature. The end immersed in heat is called a thermo-couple. The method is shown diagramatically in fig. 1.

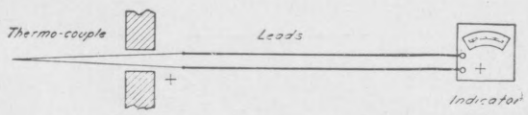


Fig. 1. Simple thermo-electric circuit

Another method of measuring heat electrically, which should not be confused with the employment of the thermo-couple, is illustrated diagramatically in fig. 2. This we may call a resistance thermometer, the general principles of which are based upon the well-known law that the resistance of platinum wire to the passage of electric current varies with temperature. With this system the coil of wire forms one arm of a Wheatstone bridge, all enclosed within the instrument case.

Current is supplied to the bridge by means of a small storage battery (B). If the resistance of the coils a, b, c and d is such as to make the proportion a/b = c/d no current will flow through the galvometer (G) which serves as a temperature indicator. The resistance of the coils is so arranged that this condition exists at the commencement or low temperature reading. That is, the connection wire (w) could be attached to the terminal of any of the thermometers (T) and the galvometer would register precisely the same as if the connection were made to the test coil (d), and in this way the correctness of the indicator's sensitivity may be checked without difficulty. This system is limited in its application to temperatures between 1000° F. above and 330° F. below zero.

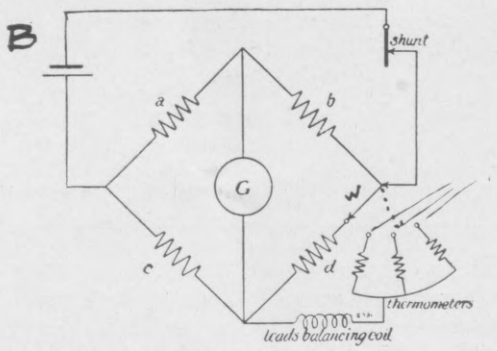


Fig. 2. Diagrams of resistance thermometer

The employment of the thermo-couple does not involve a limited height in temperature readings insofar as its application to Diesel engine work is concerned.

It is apparent that with either of these systems we are dependent upon the measurement of a very weak current of electricity to indicate the temperature change. This, however, does not detract from the accuracy of the instruments for it is known that with a bolometer used in connection with a bismuth-antimony thermo-couple as small a rise and fall as $\frac{1}{100{,}000{,}000}$ deg. c. can be read.

The very sensitivity of such instruments might lead us to believe that they were too delicate for any practical purpose aboard ship but such is not the case. An ordinary voltmeter, a millivoltmeter, and all instruments which are nothing more nor less than galvometers, are equally sturdy regardless of the current they measure.

The question of an interrupted flow of current "shorts" and "grounds" is another matter of great importance where such low voltage is used. If accuracy is desired every precaution must be taken to prevent such interruptions.

On land installations a choice may be made between a number of different methods of installation. As an example of this, where the thermo-couple is used it is necessary that the cold leads or ends of the wire which is connected to the galvometer remain at a constant temperature or that a cold junction be provided as shown in fig. 3 by means of which a constant check against the change in

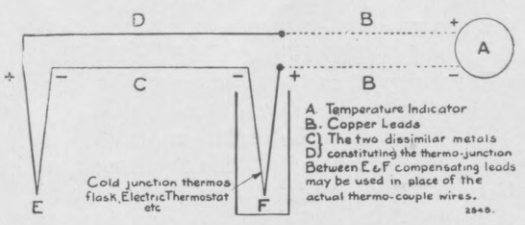


Fig. 3. Cold junction in thermo-couple

temperature of the thermo-couple exists. In marine work, however, a better plan seems to be automatic compensation, within the instrument, of changes in temperature of the cold junction rather than an attempt to hold that cold junction at a constant temperature when climatic and weather conditions cause very rapid changes. This question of cold junctions must be dealt with again.

The instrument upon which temperatures are read being a voltmeter, no description of it is needed. It is, in fact, a very commonplace electrical device.

In the thermo-couple any two dissimilar metals may be used but some are not satisfactory. Therefore metals which possess the following properties are employed. They must resist melting, corrosion, oxidation, reduction and crystallization. They must develop a rather large e.m.f. (The largest given by any thermo-couple is barely 50/1000 volt.) They must have a temperature-e.m.f. relation such that the e.m.f. increases in direct proportion to the temperature rise over the range employed. To meet these requirements where the temperature reaches almost 3000 deg. Fahr. the positive wire is platinum-rhodium and the negative pure platinum. This precious metal is not used in Diesel work, however, for temperatures of as high as 1400 deg. Fahr. may be taken with nickel-chromium and constantin, and up to 1200 deg. Fahr, with constantin and iron. In this last combination an e.m.f. of 34.8 m.v. is obtained.

The illustration fig. 4 shows a typical con-

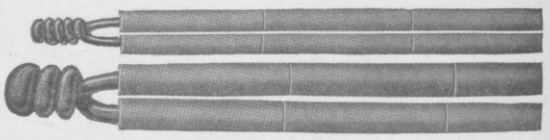


Fig. 4. Connection at hot point of thermo-couple

nection in full size of ⅛ in. and 1/16 in. wire at the hot-point of a thermo-couple. The wires are protected by porcelain as in fig. 5 and encased in tubes similar, while the binding posts are substantially protected with a fitting threaded for a conduit connection.

It should not be difficult to understand why such equipment is more substantial than an ordinary thermometer with a glass tube.

Since the electric current produced by the thermo-couple is dependent on the difference in temperature between the hot-junction in the heat and the outside or cold junction, which is connected by wiring to the indicating or recording instrument, the latter junction point must remain at a constant temperature. To accomplish this extension, leads must be employed to carry the junction to a point where the temperature is constant. On a ship there is no such place, and in order to overcome this a vacuum flask in which is a thermometer for taking its temperature may be used.

Even with the vacuum flask there is bound to be a slight variation at the cold-junction point and some instruments need to be re-set each time such change takes place. When this is done the pointer is set at zero before the connection is made by means of the selective switch to the thermo-couple. A zero adjusting screw is fitted to each instrument for this purpose.

There is what is known as an automatic cold junction compensated pyrometer which does not need to be set with each change in the

cold junction temperature. Fig. 6 shows a typical instrument of this sort. In it automatic compensation is obtained by means of two thermostatic spirals. One spiral controls

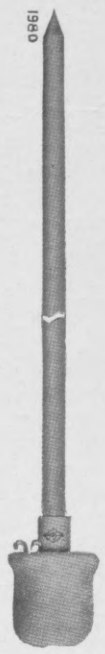


Fig. 5. Thermo-couple wires protected in porcelain

an index and the other directly controls the spring and moving element. The instrument pointer therefore indicates the correct temperature at the thermo-couple regardless of whether the atmospheric temperature surrounding the instrument raise or fall. The instruments are also automatically compensated for changes in temperature within the instrument over the working range of the instrument.

It is readily apparent that these instruments have been developed for a work where a greater range of temperature and higher degree of accuracy is demanded than is commonly considered necessary in the ordinary run of motorship or oil engine work, but that detracts not at all from their value for this work.

Much depends upon how the installation is made, particularly with regard to wiring and location. For measurement of exhaust gas temperature on a 6-cylinder engine seven thermo-couples should be installed. One should be just outside the exhaust ports or exhaust valve of each cylinder and one in the exhaust pipe between the engine and silencer. This last one serves to keep a constant check on all of the exhaust gases simultaneously and continuously but is not always a true indication of the temperature of the gases as they leave the engine because there is sometimes

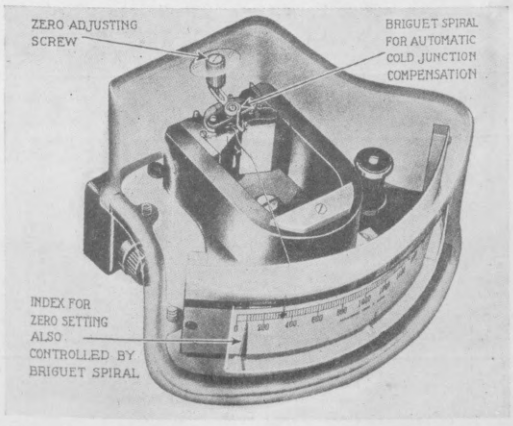


Fig. 6. Automatic cold junction compensated Pyrometer

a continued combustion of unburned products within the exhaust pipe. In other instances where such continued combustion does not exist and the pipes are water cooled there is a lowered temperature in place of a raise. Therefore the temperature may be slightly higher or slightly lower in the main exhaust pipe than at the exhaust outlet on the engine. This difference is seldom more than 15-20 deg.

Although exhaust gas temperatures are never high enough to damage a well-constructed thermo-couple it is a good plan when possible to install these vertically and in a direct path of the outrushing gases. By placing them in a horizontal position they may sag slightly in the heat. If they are side-pocketed some exterior cooling effect may cause a false reading. The gases may not damage the protecting tube but the tubes should be removed twice or three times a year and their condition be checked.

The instrument should be placed on a solid support which does not vibrate, preferably on an instrument or gauge board. It should not be placed in the draft from a ventilator where salt air and spray may strike it. It should be kept away from escaping steam, if such exists. Hot pipes, dripping oil, and high tension wires are all to be avoided. If placed under a grating or ladder, a shield should be provided to keep dirt from falling on it. The engineer on watch should be able to see it from the maneuvering platform. The instrument should not be located where heavy tools or tackles will strike it during repair work. Furthermore, do not depend upon removing it and putting it away in the storeroom or elsewhere for safe keeping during repairs. The possibility of carelessness or error in replacing it is too great.

Wires running from the junction heads on the thermo-couples to the switches and instrument should be in conduit or armored cable. They should not run parallel to and close to a lighting circuit or power line carrying 110 or 220 volts or more, because even a very weak induction of current will cause inaccuracies. Exceptional care should be used in drawing the wires through the conduits to prevent "peeling." All connections should be soldered, not hooked or twisted together, and then well insulated with rubber gum and friction tape.

At the exhaust pipe where the thermo-couple is installed and where the temperatures change with the speed and load of the engine, extension leads should be installed—not copper wire. These leads will be made for the job by the manufacturer of the instruments and at no time should copper wire be substituted for them. All connections to the thermo-couple must be kept clean because loose or dirty connections will cause low readings. If the conduits pass through hot places, 300 deg. Fahr. or more, asbestos insulated wires should be used in place of rubber. No open wiring or temporary connections or bunched wires can be used if accuracy is expected.

An instrument seldom gets out of order if properly installed. If it fails to register accurately it is best to look to the condition of the wiring and thermo-couples. One or two spares of the latter should be carried.

There may be dirt on the scale, or the pointer may be touching the scale, in which event the engineer may remove the instrument case and carefully lift the pointer or clean away the dirt, being careful not to get more dirt or dust in it than he removes. Any other trouble is a job for a man qualified to repair electrical instruments. The ordinary run of screwdrivers, hammers, pliers and jackknives are not suitable for making repairs to such instruments.

Where recording instruments are installed they should be located in the chief engineer's room. The indicator is intended to show the man on watch what is going on in the way of temperatures at any time he wishes to know. The recorder is for the benefit of the chief engineer aboard ship or the superintending engineer ashore and provides a means of keeping a continuous record at all times.

Two typical wiring diagrams are reproduced here with a view to showing of what such a system consists. Each shows a recording instrument connected in but where that is not desired the wiring arrangement may be

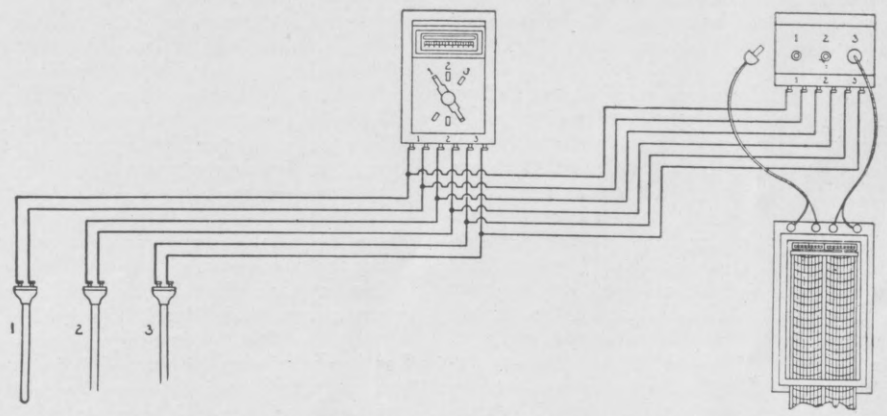


Fig. 7. Thermo-couples connected to indicating pyrometer and recorder

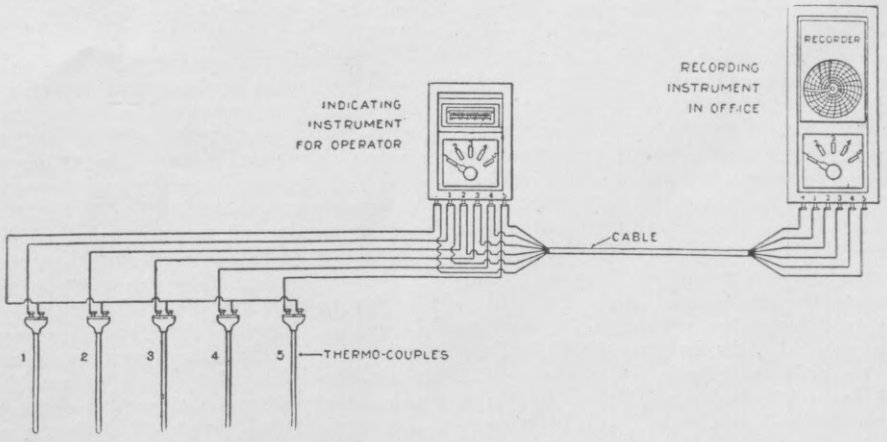


Fig. 8. Thermo-couple installation with common return

changed to eliminate them.

Fig. 7 shows three thermo-couples connected to an indicating pyrometer through a double-pole rotary switch and then to a recorder through a plug type switch. Forming a complete electrical circuit as they do, each thermo-couple is free of the danger of grounding between the others. Obviously the greater expense involved, over that of making an installation with a common return such as is shown in Fig. 8 where the grounding of one means the grounding of all thermo-couples, is fully justified.

The object of this article has not been to instruct the man who is already thoroughly familiar with it and expert in his line. That requires a course of training broad and thorough. Rather, the object has been to show the man who is using such a system what it is and to give the one contemplating its installation an idea of what it really will do, or fail to do, in service.

Although most of the space has been devoted to a description of methods of taking high temperature readings, the other question of taking low temperatures is not without its interest. Attention is therefore called to the possibilities of the second system mentioned at the beginning of this article by means of which the resistance thermometer is used.

This may be used in cold storage, fruit ships, liquid cargo, the holds, bunkers, etc. A continuous record may be kept with the recording instrument and an instant reading may be taken with the indicator. The instruments may be in the captain's quarters or the chief engineer's.

There could then be no question in the office of a fruit company as to what the cargo temperatures had been. It would mean a protection to the ship's crew and satisfaction to the owners. It is worth looking into and for this reason it is mentioned even though we are here primarily interested in the propelling plant of Diesel type.

Recent Diesel Engineering Books

Science for Research

WITH the ever-sharpening focus of engineering interest on research in oil engine technology it is only natural to observe an increasing demand for ultra-modern scientific information. While television has become an accomplished fact, the pioneers of oil engine development have not been asleep at their posts, as witness the resort to spectroscopy as a means for determining the specific heats of diatomic gases at high temperatures, or the analysis of crankshaft stresses by the theory of mechanical oscillations.

No apology is therefore needed for calling the attention of the technical oil engine public to an excellent little volume entitled "Physical and Chemical Constants," by G. W. C. Kaye and T. H. Laby (Longmans, Green & Company, 161 pp., 6¼ in. x 9½ in.). To a person scanning this volume for the first time it is astonishing to note what a wealth of physical and chemical science can be condensed into a space relatively so small. It is perhaps not too much to state that with the help of these tables of scientific constants it would be possible to re-enact every step of scientific progress that has been taken by man during the twentieth century—all without actually making a single laboratory experiment. It is a time-saver of the first importance, particularly for the oil engine man who cannot hope to plunge into the depths of physical science to the same extent as has been done by the learned compilers of "Physical and Chemical Constants."

Running and Maintenance

As the majority of marine Diesel engineers are probably recruited from the ranks of the men who have "done their time" on steam vessels, a demand soon arose that Diesel technology should be translated into the steam vernacular. Not literally, to be sure, because obviously there are plenty of particulars on a Diesel engine for which not even a remote correspondent can be found in the engine room of a steamer. It was not to be expected that the somewhat sudden and unceremonious introduction of the Diesel should instantly cause so numerous and well-established a guild as the marine steam engineers to change their mode of thought forthwith. Apparently, in order to gain access to the understandings of the slower-moving ones, John Lamb, in "The Running and Maintenance of the Marine Diesel Engine" (J. B. Lippincott Co., Philadelphia), has re-worded current operating information pertaining to Diesel engines to make it read very much like the scores of similar books published on marine steam machinery.

Like a good many books in which this or an equivalent mental attitude is struck, it inclines a little towards bulkiness. It contains 511 pages (5 in. x 7½ in.) and 225 illustrations, most of the latter being rather indifferent pen-and-ink sketches. Not all of this bulkiness is due to the inclusion of what some will regard as extraneous matter; it is more likely that some of the apparently superfluous text is due to elaborate explanations of particular rather than representative mechanisms. There are probably very few general readers who will wish to follow through "lever A pushes latch C," particularly if no obvious hint has been given as to how the mechanism in question is related to broader general principles. Voluminous though the book therefore appears to be upon superficial examination, the real amount of substance in it dwindles with closer study. It has a certain "over-stuffed" character which a chatty, conversational style of writing does not altogether rob of its dullness.

Broadly speaking, it appears as though the author had paid too high a price for the privilege of maintaining a steam-engine room atmosphere in a book primarily devoted to Diesel machinery. It would be idle to deny that there is no definite demarkation between the two classes of mechanisms. To be real and stimulating, a book should throw the contrast between steam and Diesel into bold relief and must economize the reader's powers of attention in every possible way if it is to stimulate him up to the point where he will progress away from steam and towards the Diesel.

Diesel Engines

Any ordinary author of a Diesel engine text book who might sit down to write a book conveying essentially new information would immediately find himself in difficulties. The result has been that the recent rather voluminous crop of bound volumes on this subject has been made up to a large extent of press clippings varying as to completeness and amount of re-editing. The new Diesel engine books that went beyond this are few and their authors are men who have their own engineering grasp of the subject.

It is somewhat difficult to classify A. H. Goldingham's "Diesel Engines" (Third Edition, Spon & Chamberlain, 255 pp. 5½ in. x 8¾ in., 185 figures) in such a way as to make apparent whether it falls into the class of press-clipping collections or of original text-books.

A preliminary examination of the book reveals a considerable number of the old-familiar, cross-sections and diagrams which certain manufacturers have distributed to the engineering press with a liberal hand for the past few years. In most cases the text matter accompanying them is also just what a consistent reader of recent periodical literature pertaining to this subject would most naturally expect to find. On the other hand, it can hardly be said of this book that it is by any means a complete collection of modern press-references to the Diesel engine. Many omissions could be pointed to that would be considered significant. Concerning the material that is included the doubt might be raised as to whether it is best representative.

In attempting to apply the test of original authorship one encounters such passengers as this, concerning cylinder heads: "Owing to its necessary complex form the 4-cycle cover, containing valves, valve casings, and passages, is designed with metal thickness ample to withstand maximum pressures in operation and also to allow as rapid dissipation of heat as possible." Surely an engineer-author who has actually done battle with cylinder head casting problems should have more than this colorless statement to make on so acute a matter. Even a press-clipper could have found something better to say than that among the wealth of periodical references available.

As a volume not altogether measuring up to the requirements of a press-clipping collection and fully meeting the standards set by creative authorship, this book leaves open the question as to what was gained by adding it to the list of works already on the market.

Personal

Frederick M. Fisk on July 1st became manager of the Pacific Coast office of McIntosh & Seymour Corporation, 815 Sheldon Building, San Francisco. Mr. Fisk is well known in his territory through former connection with various important engineering enterprises and has had extensive Diesel engine experience in the McIntosh & Seymour plant in Auburn, N. Y., and outside. Mr. Fisk is therefore thoroughly familiar with details and performance of McIntosh & Seymour units and is exceptionally well qualified to co-operate in both marine and stationary power plant work.